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ABSTRACT

This document, the third of five volumes that comprise the final report of the National Assessment of Vocational Education focuses on program improvement. Chapter 1 describes the education reform movement and assesses its effects on vocational education. It discusses current reforms that states are undertaking to improve preparation of students for the work force. Chapters 2-6 deal with vocational education reforms. Chapter 2 summarizes states' progress in developing and implementing a system of performance measures and standards, explores progress at the local level in implementing these systems, and discusses the current status of performance measures and standards. Chapter 3 describes federal efforts to develop voluntary national skill standards and measures, proposes a taxonomy of skill standards, and examines advantages and disadvantages of industry skill standards and measures. Chapters 4-6 examine development and implementation of school-to-work transition reforms at state and local levels. Chapter 4 on integration of academic and vocational curricula describes secondary and postsecondary efforts, assesses the scope and impact of integration, and examines the effectiveness of integrated approaches. Chapter 5 examines implementation of tech prep programs and assesses their scope and impact. Chapter 6 on work experience programs describes cooperative education, youth apprenticeships, and school-based enterprises and examines their effectiveness. Endnotes follow each chapter. Appendixes include data tables, graphs, and definitions. (YLB)

ED 371 193

# FINAL REPORT TO CONGRESS

## VOLUME III

## PROGRAM IMPROVEMENT: EDUCATION REFORM

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NATIONAL ASSESSMENT
OF VOCATIONAL EDUCATION

# FINAL REPORT TO CONGRESS

## VOLUME III

## PROGRAM IMPROVEMENT: EDUCATION REFORM

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**U.S. Department of Education**

**July 1994**

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## PREFACE

This is the third of five volumes in the Final Report of the National Assessment of Vocational Education, mandated by Congress in the 1990 Perkins Act and prepared in the Office of Research, Office of Educational Research and Improvement (OERI). The Final Report substantially expands and updates the Assessment's Interim Report, presented to Congress in January, 1994.

This volume contains six chapters. Each has a principal author (or authors), but may also incorporate the work and views of other researchers. The chapters and their principal authors are as follows:

**Part I. Education Reform and Performance Standards**

Chapter 1. The Effects of Education Reform on Vocational Education — David Boesel

Chapter 2. Performance Standards and Measures — Mikala Rahn and Martha Alt (MPR Associates)

Chapter 3. Industry Skill Standards — Mikala Rahn, Steven Klein, and David Emanuel (MPR Associates)

**Part II. The School-to-Work Transition**

Chapter 4. Integration of Academic and Vocational Curricula — David Boesel

Chapter 5. Tech-Prep Programs — David Boesel

Chapter 6. Work-Based Learning — Sharon Deich (Pelavin Associates)

Chapter 3 is new. The other chapters, earlier versions of which were included in the Interim Report, also contain new material, including survey data collected in 1993.

While conducted within OERI, this assessment is an independent study and does not necessarily reflect the views of OERI or the U.S. Department of Education.

David Boesel
Director, National Assessment
of Vocational Education

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# INTRODUCTION

## BACKGROUND

Since the 1960s, federal vocational education laws have had two overriding goals — to promote program improvement and to provide additional support for special population students. This volume of the report focuses on program improvement; Volume IV focuses on access to programs and services for special populations.

In previous Acts, program improvement comprised a variety of activities (other than those funded by special population set-asides) designed to strengthen vocational education. Prominent among these activities was the purchase of equipment, teacher training, and technical assistance.

The 1990 Perkins Act also emphasizes program improvement, but it does so within the context of broad education reforms which the Act incorporates. The Act requires states to develop and implement systems of performance standards and measures. It requires local grant recipients to integrate their vocational and academic curricula. It encourages and provides funds for tech-prep programs that link occupational training in the last two years of high school with two years of postsecondary education. And it permits basic grant funds to be used for work-based education programs such as co-op and apprenticeships. Integration, tech-prep, and work experience programs have become key elements in school-to-work transition reforms, intended to prepare students for the workforce and to enable them to move efficiently into good jobs. As such, they provide much of the programmatic structure found in the School-to-Work Opportunities Act.

The inclusion of the new requirements for performance standards and of school-to-work reforms in the 1990 Perkins Act made it qualitatively different from earlier vocational education legislation. Rather than focusing on incremental improvements, it called for broad reforms. In effect, the major program improvements promoted by the Act constitute education reform.

## ISSUES ADDRESSED IN THIS VOLUME

### Part I. Education Reform and Performance Standards

### A. Reform and Vocational Education

A broad education reform movement began in the early to mid-1980s, prompted by concerns about America's competitiveness in the international economy and the poor performance of American students on international tests. The movement called for greatly improved academics, to be achieved primarily through increased education standards and accountability (teacher and student

testing). Increased academic standards for high school graduation were instituted in many states and districts at a time when vocational enrollments were declining.

In the mid- to late 1980s, a second wave of reforms sought to go beyond academics and accountability. Unlike the first wave, it tended to focus on non-college-bound students and to emphasize restructuring secondary curricula and organizations. The movement also included many educators and researchers intent on reforming vocational education. An obvious question, and one posed in the Perkins Act, is:

- What is the effect of education reform on vocational education?

Chapter 1 describes the education reform movement and assesses its effects on vocational education, as required by Section 403(b)(5)(A) of the Act. In addition, it describes current reforms that states are undertaking to improve the preparation of students for the workforce.

**B. Performance Standards and Measures**

The development of academic standards and measures, a major first wave reform, was undertaken by the newly formed National Council on Standards and Testing. Several years later, the 1990 Perkins Act required states to develop systems of performance standards and measures to be used in local assessments of vocational education programs. Regular assessments would enable local systems to identify program strengths and weaknesses and to use the information to improve vocational programs. In this area of reform, members of Congress and other federal policy makers need to know:

- How responsive have states been in developing the systems of performance standards and measures required by the Perkins Act, and how are they being implemented?

Chapter 2, dealing with Perkins performance standards, addresses these questions.

**C. Industry Skill Standards**

The education reform movement's emphasis on standards has affected vocational education directly in the Perkins requirement that states develop systems of performance standards and measures to assess programs — essentially accountability systems. The reform movement's emphasis on standards is also beginning to affect vocational education in a second way — through the development of national industry skill standards. The Goals 2000: Educate America Act establishes a National Skill Standards Board to facilitate the development of a comprehensive system of voluntary industry skill standards.

Unlike the Perkins standards, which are designed to assess and improve programs, industry skill standards are being designed primarily to link individuals to the labor market by motivating students to acquire skills and by certifying and communicating skill attainment to employers. Of course, such standards could also be incorporated in systems of program assessment. In this context, several questions arise:

- What kinds of skill standards are being developed? What evidence is there that industry skill standards can achieve the desired effects? What kinds of skill standards should be developed?

Chapter 3, on industrial standards, discusses these and related questions. It describes federal efforts to develop voluntary national skill standards and assesses their compatibility with the performance assessment systems states are developing in response to the Perkins requirement. It examines current evidence concerning the advantages and disadvantages of industry skill standards. It also proposes a taxonomy of skill standards.

**Part II. The School-to-Work Transition**

The second wave of the education reform movement includes proponents of several diverse approaches to restructuring elementary and/or secondary education. Of primary interest here is the effort to improve the preparation of non-college-bound high school students for work. The principal elements of this school-to-work transition reform, all included in the Perkins Act, are integration, tech-prep, and work experience programs.

The integration of academic and vocational education is intended to end the cultural and curricular separation of the two spheres, maximizing the potential contribution of both by emphasizing applied or contextual learning. For example, students might learn math, and its potential applications, by learning how to work with electric circuitry.

Tech-prep programs are designed to produce technically skilled graduates at the associate degree level by linking secondary and postsecondary occupational programs in articulated course sequences. Tech-prep proposes a unified, integrated block of academic and occupational/technical education, usually comprising the last two years of high school and two years of community college.

Work experience programs allow students to learn first-hand about the world of work while still in school. In work-based programs, such as apprenticeship, students learn job skills by working part-time in business and industry. Work experience programs also include a range of other activities such as job shadowing and school-based enterprises, where students manage small businesses based in the school itself — for example, running the school cafeteria,

building and selling houses. Work experience programs are not required of Perkins grant recipients, as integration is; nor does the Act designate specific program funds for them, as it does for tech-prep. But they are allowable expenditures of basic grant funds, and they are examples of business-education-labor partnerships which the Act authorizes but does not fund under a separate title.

The key policy questions regarding these school-to-work transition components are:

- How well are integration, tech-prep, and work experience programs being implemented or established? What evidence is there that these programs and activities are having the desired effects?

Chapters 4 through 6 examine the development and implementation of school-to-work transition reforms at the state and local levels.

Chapter 4, on integration of academic and vocational curricula, describes integration efforts of secondary schools and postsecondary institutions; assesses the scope and impact of integration; and examines evidence concerning the effectiveness of integrated approaches to learning. Chapter 5, on tech-prep programs, examines the implementation of these programs and assesses their scope and impact. Chapter 6, on work experience programs, describes cooperative education, youth apprenticeships, and school-based enterprises and examines research pertaining to their effectiveness. It also describes and assesses the value of jobs that students obtain on their own while in high school.

# PART I

# EDUCATION REFORM AND PERFORMANCE STANDARDS

# CHAPTER 1

# THE EFFECTS OF EDUCATION REFORM ON VOCATIONAL EDUCATION

## INTRODUCTION

The Perkins Act calls for the National Assessment of Vocational Education to examine "the effect of educational reform on vocational education."[1] The chapter will address this issue in some detail, but first it is important to understand what education reform encompasses and how it is related to vocational education.

Over the years there have been periodic education reform movements. The latter half of this century has seen increased emphasis on mathematics and science, prompted by the Soviets' launching of Sputnik; the movement to create and expand community colleges; the movement toward (and later retreat from) open schools and classrooms; increased attention to the needs of special population students, generated by the broad social movements of the 1960s and 1970s; and more recently, the calls for better education to improve the nation's competitiveness in the global economy.

Recent education reforms began in the early 1980s and have focused on secondary education, prompted by concern about the nation's declining competitiveness in the international market, the relatively poor performance of American students on tests of educational achievement (both nationally and internationally), and complaints from the business community about the low level of skills and abilities found in high school graduates entering the work force.

A recent review of the literature on education reform finds a consensus that there have been two waves of reform since 1980, both focused on secondary education.[2] The first wave, sometimes characterized as academic reform, called for increased effort from the current education system: more academic course requirements for high school graduation, more stringent college entrance requirements, longer school days and years, and an emphasis on standards and testing for both students and teachers. The basic message might be paraphrased, "work more, try harder, strive for excellence."

Beginning in the mid-1980s, a second wave of school reform arose, based in part on the belief that the first did not go far (or deep) enough to improve education for all students. Sometimes referred to as "restructuring," the second wave called for changes in the way schools and the educational process are organized. While restructuring proposals included school choice and site-based management, of particular interest in this report is the emphasis on improving the school-to-work transition for non-baccalaureate youth by creating closer linkages between

vocational and academic education, secondary and postsecondary institutions, and schools and workplaces.

The reform movement — and particularly its first phase — received major impetus from the publication in 1983 of *A Nation at Risk*, the report of the National Commission on Excellence in Education.[3] This influential report observed that the United States was losing ground in international economic competition and attributed the decline in large part to the relatively low standards and poor performance of the American educational system. The report recommended many of the changes subsequently enacted in first-wave reforms: the strengthening of requirements for high school graduation, including the requirement of a core academic curriculum; the development and use of rigorous educational standards; more time in school or the more efficient use of presently available time; and better preparation of teachers.

The response to this report and related education reform initiatives was rapid and widespread. One researcher found that between the early and mid-1980s, more than 275 education task forces had been organized in the United States.[4] By the mid-1980s, 43 states had increased course requirements for high school graduation; 17 had developed stronger requirements for admission to state colleges and universities; 37 had created statewide student assessment programs; 29 had developed teacher competency tests; and 28 had increased teacher certification requirements. Between 1984 and 1986, more than 700 state laws affecting some aspect of the teaching profession had been enacted. By 1990 many of these numbers had increased even further.

The next section looks at the prevalence of Wave I and Wave II non-vocational education reforms in states and districts. Subsequent sections of the chapter relate Wave II structural reforms in vocational education to these non-vocational reforms. Chapters 2–6 deal explicitly with vocational education reforms, especially those in the Perkins Act. Because the recent reform movement has focused primarily on secondary education, this chapter deals only with secondary state agencies and secondary districts.

## STATE AND LOCAL REFORM EFFORTS

The Omnibus Survey provides data from administrators in secondary state education agencies, regular school districts, and vocational districts on education reform steps that have been taken in recent years. (The Omnibus Survey is described in the Technical Appendix in Volume V.) The proportions of administrators at each level who said that policy changes associated with certain education reform measures had occurred by 1991–92 and the proportions who said that such changes are likely in the near future, mostly in 1992–93, are shown in Table 1.1.[5]

**Table 1.1**
**Education Reform Measures Reported by State and Local Vocational Education Administrators (Percent)**

| Reform Measure | State | | Regular District | | Vocational District | |
|---|---|---|---|---|---|---|
| | Occurred by 1992 | Likely | Occurred by 1992 | Likely | Occurred by 1992 | Likely |
| Wave I | | | | | | |
| Increase in academic credits required for graduation | 88 | 10 | 79 | 8 | 87 | 5 |
| Increase in academic credits required to enter state university | 64 | 10 | 64 | 11 | 66 | 9 |
| Increase in academic credits needed for teacher certification | 48 | 17 | 56 | 15 | 57 | 14 |
| Proficiency or other exam required for graduation | 29 | 42 | 38 | 28 | 37 | 37 |
| Mandate of longer school day | 10 | 19 | 13 | 15 | 8 | 15 |
| Mandate of longer school year | 13 | 24 | 19 | 19 | 10 | 17 |
| Elimination of BA in Education in state university system | 9 | 0 | 5 | 2 | 3 | 8 |
| Wave II | | | | | | |
| Implementation of site-based management | — | — | 34 | 35 | 33 | 36 |
| Relaxation of state administrative rules for local districts | 33 | 35 | 14 | 18 | 13 | 25 |
| Establishment of parental choice plan | 26 | 24 | 18 | 20 | 17 | 28 |
| Elimination of the general track | 6 | 67 | 16 | 29 | 11 | 46 |

NOTE: Responses to a third option, indicating that a reform had not occurred and was not likely to occur, have been omitted. If they were included, the three columns would total 100%.

Source: Omnibus Secondary State Survey and District Surveys, Version B and Vocational

### Academic Reforms

There is substantial consensus among the respondents on these questions. Several first-wave reforms are widespread. These reforms are typically the result of decisions taken at the state level and implemented in the localities. The reforms made by the greatest number of states and districts reflect the first-wave emphasis on higher standards and greater effort, particularly in improving academics.

By 1991–92, the great majority of state and local agencies (79–88%) had enacted policies increasing the proportion of academic credits required for high school graduation, and two-thirds reported increases in the proportion of academic credits required to enter state university systems. About half of the respondents (48–57%) reported mandatory increases in the academic college credits needed for teacher certification. Relatively small proportions reported mandates for a longer school day (8–13%) or a longer school year (10–19%), but those proportions would increase substantially if plans to institute the changes in 1992–93 were carried out.

The least widespread reform, by all accounts, is the elimination of the bachelor's degree in education in the state university system. The criticism of education departments in colleges and universities by reformers in the 1980s and the attendant call for the elimination of BA degrees in education seem not to have taken hold.

### Restructuring Reforms

A significant number of respondents also reported (non-vocational) second-wave "restructuring" reforms that had taken place by 1991–92, and many more reported plans to implement them in the future.

One such reform is site-based management, which involves a downward shift in decision-making and responsibility from states to districts and from districts to schools. By 1991–92 one-third of the state respondents said their states had relaxed administrative rules for local school districts, giving them greater autonomy and flexibility; another third planned to do so in the following year.

The districts are not as likely as the states to report these changes: Only 13–14 percent said that state administrative rules had been relaxed. Local districts may be less aware than the states are of rule changes that could increase local decision-making power. Alternatively, they may have different perceptions of state actions — a rule change that may seem like a major "relaxation" to a state may seem more like a minor change to localities. Another possibility is that in this instance, one-third of the states encompass about 13 percent of the school districts.

The local counterpart of the relaxation of state control over districts is the loosening of district control over schools. One-third of both the regular and the vocational districts said that site-based management had been implemented in their states or districts by 1991–92, and another one-third indicated that such changes are planned in the future. However, ambiguity in the wording of the question makes these data hard to interpret. We cannot tell whether the changes are at the state or local levels, and hence we cannot conclude that one-third of the districts have site-based management.

Another second-wave reform, school choice, is less widespread than site-based management. A little over one-fourth of the state agencies reported that some parental choice plans had been implemented in their states by 1991–92, and another one-fourth said that such plans would be implemented in the future. Somewhat smaller proportions of regular and vocational districts (17–18%) reported the presence of parental choice plans, but as with local site-based management, these district data are difficult to interpret, and should be treated cautiously.

One structural reform reported by the administrators has particular significance for vocational education — the elimination of the general track in secondary schools. There seems to be a growing consensus among educators that general-track education is a poor investment of time and resources. In the absence of other structural changes, the elimination of the general track would route students into either academic or occupational programs. This could have a substantial effect on vocational enrollments, broadening the student base of vocational education and facilitating the development of tech-prep programs.

By 1991–92 only 6 percent of the state administrators reported policy changes designed to eliminate the general track in their states or districts. However, an **additional two-thirds of the states** said that this reform is likely to occur in the future (most said in the next year). If this change takes place as anticipated, almost three-fourths of the states will have adopted reform policies to eliminate the general track within the next several years, with major implications for vocational education.

## THE EFFECTS OF EDUCATION REFORM ON THE PERKINS ACT

To some extent, the Perkins Act reflects first-wave academic reforms and introduces them into vocational education. In a major way, the Act also encompasses and promotes second-wave structural reforms.

Generally, the Perkins emphasis on improving the academic content of vocational programs seems to reflect the academic emphasis of the first wave. More specifically, the Act's increased emphasis on performance standards and measures for vocational education seems to be part of the continuing Wave I reforms, extended to vocational education. The Perkins requirement can be

viewed as the vocational counterpart of the state and federal effort, manifest in the National Council on Standards and Testing, to develop standards for academic curricula. [6]

Three other important elements in the Perkins Act — the integration of academic and vocational curricula, 2+2 tech-prep programs, and work experience programs — are part of the Wave II restructuring movement. Collectively these three proposed changes are often regarded as key components of the school-to-work transition.

Integration can be seen as a restructuring response to *A Nation at Risk*. Although the idea of learning by doing is an old one, current efforts to link academic and vocational education arose largely in response to *A Nation at Risk*. Critics charged that the report was elitist and that it did not place enough emphasis on preparing non-college youth for work. A year after the report's publication, the National Commission on Secondary Vocational Education published its own report, *The Unfinished Agenda: The Role of Vocational Education in the High Schools*.[7] This Commission stressed that secondary academic and vocational education were separate and isolated, denying students the opportunity to understand the "interrelatedness of ideas, the implications and applications of knowledge, and the process of discovery, dissemination, and use of information." The report recommended "bridging the gap" by encouraging secondary vocational education programs to place more emphasis on instructing students in "the basic skills of reading, writing, arithmetic, speaking, listening, and problem-solving."[8]

Tech prep can also be seen as a restructuring response to *A Nation at Risk*. Although the idea of tech prep had been around for a number of years, it was first systematically formulated and widely disseminated in Dale Parnell's *The Neglected Majority*,[9] which was published in 1985, just two years after the report. Like *The Unfinished Agenda*, it reflected a belief that *A Nation at Risk* addressed only part of the problem in American education.

At the outset, Parnell noted that the education reform movement was "led by the clarion call to the American people of *A Nation at Risk*." Parnell asserted that the report was pitched to the one-quarter of American high school students who eventually graduate from four-year colleges and that it ignored the other three-quarters — the neglected majority. In his view, the report "paid scant attention to non-college youth as a target audience or vocational education as a viable part of a school reform strategy."

To provide greater structure, motivation, and continuity for secondary students, especially the non-college-bound students, Parnell proposed that the general track in secondary schools — "the academic and vocational desert of American education" — be eliminated and that high schools be restructured to provide: (a) a college prep program for the top one-quarter of students (in terms of achievement and interest), who are likely to attain baccalaureate degrees; (b) a

tech-prep program for the middle two quartiles, leading to a two-year associate degree; and (c) a vocational program for the lowest quartile of students, leading to a high school diploma and work. Students would choose to enter one of these three programs in the 11th year of school.

While 2+2 tech-prep programs had earlier been advocated by organizations such as the Southern Regional Education Board, only a handful of these programs existed in the country at the time Parnell wrote his book.[10] The number of tech-prep initiatives grew rapidly in the latter half of the 1980s: According to Omnibus Survey data, about 40 percent of public two-year postsecondary institutions were beginning to develop tech-prep programs by the 1990–91 school year.

The American Association of Community and Junior Colleges, of which Parnell was executive director, took his message to the Congress to seek federal funds for tech-prep reforms. Over a period of time, such advocacy persuaded the Congress to include the "Tech-Prep Education Act" as part of Title III of the 1990 Perkins Act. This part of the Act gives states funds earmarked for the development of tech-prep programs through grants to local consortia of secondary and post-secondary institutions.

In addition to integration and tech prep, the restructuring movement included renewed interest in work experience programs such as cooperative education and apprenticeship. Both of these types of programs have long histories. The co-op movement started around the turn of the century and first received federal support in the 1917 Smith-Hughes Act. Apprenticeship, of course, goes back to the Middle Ages in Europe; in the United States it was a common practice in the early years of the republic. Over time it has given way to other forms of training for occupations, but it is still found in some trades, especially those in the construction industry.

In the mid-1980s both co-op and youth apprenticeships were promoted by the restructuring movement as work-based alternatives to the existing school-based education that seemed ill-suited to the needs of many non-college-bound students. The restructuring movement adopted and promoted the co-op model without much change. The apprenticeship model, however, took a new form. Traditional apprenticeships were (and are) primarily run by unions and trade associations for younger adults who have completed high school and are in the labor market. The new "youth apprenticeships" are for students in high schools and non-baccalaureate postsecondary institutions and are sometimes coordinated by states in conjunction with reform groups such as Jobs for the Future in Cambridge, Massachusetts.

## THE EFFECTS OF NATIONAL AND STATE INITIATIVES ON LOCAL REFORM EFFORTS

This section examines the relation between a number of national and state education reform efforts, on the one hand, and integration, tech prep, and performance standards in local districts. The national efforts include the Perkins Act, the SCANS[11] report, and the National Education Goals. State efforts include state support for integration and tech prep, as well as several of the non-vocational education reforms discussed previously.

A key question is whether federal and state education reform initiatives have promoted integration, tech prep, and performance standards at the local level. Is there evidence that the Perkins Act, and state efforts in support of the Act, are related to increased implementation of these three initiatives in school districts? Is there evidence that other federal and state reform efforts, such as the SCANS report and increased academic requirements, are related to local reform?

Multiple regression analysis was used to address these questions. Separate analyses were conducted on three outcome variables: (a) number of steps taken by districts to integrate academic and vocational education; (b) number of steps taken to develop tech-prep programs; and (c) number of measures used by districts in performance assessment systems.

The explanatory variables for the integration and tech-prep equations included (a) Perkins influence on integration (or tech prep) as perceived by regular school district administrators; (b) perceived influence of other national education reforms on integration (or tech prep); (c) state support for integration (or tech prep); (d) academic reforms; and (e) restructuring reforms.[12] Several school district characteristics were also screened for inclusion in the equation — urbanicity, district size, and proportion of special populations. Of these, only district size was significantly related to the outcome variables and was therefore included in the equation as a control. The construction of these variables is explained in Appendix 1-A.

As Table 1.2 shows, the perceived influence of the Perkins Act is significantly related to the number of steps (listed in the survey) that districts take to integrate their academic and vocational curricula and to develop tech-prep programs. Districts that report a large Perkins influence have taken 1.0 more step to integrate (out of a possible ten) and 1.5 more steps to develop tech-prep programs than those that report no Perkins influence.[13]

Other national education reforms, such as SCANS and the National Goals, are significantly related to local academic/vocational integration efforts, but not to tech-prep efforts. Districts that say these reform initiatives have had a large influence on their integration efforts have taken 1.3 more steps to integrate their curricula than those that report no influence.

**Table 1.2**
**Factors Associated With Integration, Tech Prep, and Performance Standards**

| Independent Variable | Number of Steps to Integrate | | Number of Steps to Develop Tech Prep | | Number of Performance Measures Used | |
|---|---|---|---|---|---|---|
| | Co-efficient | Significance Level | Co-efficient | Significance Level | Co-efficient | Significance Level |
| Perkins influence* | .33 | .0016 | .51 | .0014 | — | — |
| Other national reforms* | .44 | .0134 | .34 | .1345 | — | — |
| State support* | .77 | .0001 | .15 | .6032 | 1.21 | .0003 |
| Academic reforms | .55 | .0535 | .71 | .1095 | .78 | .1021 |
| Restructuring reforms | .26 | .0406 | .45 | .3402 | .12 | .8244 |
| District size | .15 | .0840 | .49 | .0001 | .62 | .0001 |

*As perceived by respondents

NOTE: Coefficients estimate additional reform steps associated with each additional increment in the independent variable, controlling for the other independent variables.

Source: Omnibus District Survey, Version B

State support for reforms is strongly and significantly related to local integration and performance standards, but not tech prep. Districts that say they have very good state support for integration have taken 1.5 more steps to integrate than those saying they have little or no support. Districts reporting very good state support for performance assessment are using 2.4 more performance measures than those with little or no support. These districts may be implementing state-developed performance measures.

Academic and restructuring reforms are related to integration at borderline significance levels ($p = .0535$, $p = .0406$), but not to tech prep or performance standards. District size is marginally related to integration but strongly related to the development of tech prep and performance standards; larger districts tend to be more active in implementing these reforms.

These findings suggest, but do not prove, that the Perkins Act affects local integration and tech-prep efforts. Other national initiatives also appear to affect local efforts to integrate. Independent of the Perkins Act and other national

reform initiatives, state support for reform seems to have substantial impacts on integration and the development of performance standards. The absence of any relation between state support and tech prep suggests that tech-prep grants may be seen as arrangements between the federal government and local districts, with the states serving as intermediaries.

## EDUCATION REFORM'S IMPACT ON VOCATIONAL ENROLLMENTS

In Chapter 1 of Volume II we saw that enrollments in secondary vocational education are continuing a decade-old decline. Vocational educators think the decline is partly the result of education reforms, especially increased academic requirements for graduation, which reduce the time available for electives such as vocational education. This section will examine that argument.

In part, declines in vocational enrollments were a result of the smaller student cohorts in the late 1970s and the 1980s, which also affected academic enrollments. However, around 1990, total secondary school enrollments began to increase as the children of the "baby boom" generation started to enter high school. Nevertheless, vocational enrollments continued to decline. The pattern of increasing general enrollments and decreasing vocational enrollments was also evident in 1992.[14]

If the present pattern continues, decreasing enrollments will drain resources away from vocational programs, reducing their ability to function. Therefore it is important to go beyond examining the effects of academic reforms on vocational enrollments to look at the possible effects of other factors, as well. In particular, decision makers will find it useful to know what policy-relevant factors are associated with **increased** vocational enrollments, because these factors may present opportunities for policy changes beneficial to vocational education and the students who participate in it. This section will examine the contribution of such factors to increased enrollments.

### Effects of Academic Reform on Vocational Enrollments

First, let us examine the impact of academic reforms. Are increases in academic requirements for graduation and for college entrance causing vocational enrollments to decline? The respondents in our Community Case Studies certainly think so. (These case studies are also discussed in the Technical Appendix.) The case study summary notes that:

> It is the nearly unanimous opinion of all types of respondents that the cumulative effect of these [reforms] has been to diminish the stature of vocational education, its offerings, and its students.[15]

Opinion data from the Omnibus Survey also support this view (Table 1.3). State administrators think that education reforms have had a marked and largely

**Table 1.3**
**Administrator Reports of Perceived Effects of Education Reforms on Vocational Education Enrollments, Offerings, and Other Program Characteristics (Percent)**

| | State | | Regular District | | Vocational District | |
|---|---|---|---|---|---|---|
| | Increase | Decrease | Increase | Decrease | Increase | Decrease |
| Total district enrollment in vocational education | 16 | 71 | 21 | 45 | 19 | 60 |
| Enrollments at area vocational schools | 17 | 46 | 26 | 31 | — | — |
| Enrollment of disabled students in vocational education | 56 | 2 | 33 | 6 | 58 | 2 |
| Enrollments of educationally disadvantaged students in vocational education | 63 | 2 | 38 | 9 | 66 | 4 |
| Total number of vocational course offerings | 19 | 66 | 29 | 33 | 20 | 40 |
| Variety of vocational course offerings | 31 | 44 | 35 | 28 | 22 | 30 |
| State funds for vocational education | 29 | 27 | 18 | 43 | 19 | 55 |
| Integration of vocational and academic education | 77 | 0 | 54 | 5 | 75 | 2 |
| Articulation between secondary and postsecondary vocational programs | 87 | 0 | 60 | 2 | 80 | 1 |
| Vocational education opportunities at the middle school level | 45 | 15 | 26 | 14 | 18 | 16 |
| Number of vocational teachers | 10 | 77 | 13 | 36 | 15 | 46 |
| Quality of teaching in vocational education | 62 | 12 | 43 | 7 | 59 | 11 |

Source: Omnibus Secondary State Survey and District Surveys, Version B and Vocational

negative effect on enrollments and offerings in vocational education: 71 percent say that total vocational enrollments have decreased as a result of the reforms; 66 percent say that the number of vocational courses has decreased; and 77 percent say that the number of vocational teachers has decreased. A smaller but still substantial proportion (44%) say that the reforms have reduced the variety of vocational course offerings.

Vocational district administrators also tend to think that education reforms have caused enrollments to decrease, but the proportion who do (60%) is somewhat smaller than among state personnel. The proportion of regular district administrators who perceive this effect is smaller still (45%). The opinions of vocational and regular district administrators may reflect their first-hand experiences of enrollment decreases. As we saw in Chapter 1 of Volume II, vocational districts are more likely than regular districts to report substantial decreases in enrollments over the five years preceding 1991–92.

However, seeing these decreases and knowing that they are the result of education reforms are two different things. Using data from the Omnibus Survey, we can address this question by examining the statistical relations between the education reforms described above and changes in vocational enrollments. In the survey, administrators in regular and vocational districts were asked to indicate which reforms in a list were implemented between 1987 and 1992. Elsewhere in the questionnaire they were asked to indicate the extent of change in vocational enrollments in the same time period. Table 1.4 presents Pearson correlation coefficients and levels of statistical significance for the association between each reform variable and administrators' reports of changes in vocational enrollments in their districts. (A correlation of 0.0 means that there is no relation between two variables; a correlation of 1.00 is a perfect association, in which every change in one variable is matched by an identical change in the other.)

As the table shows, there are few significant associations between the education reforms listed and changes in vocational enrollments, and those that exist are weak. Specifically, there is no significant relation between increases in the proportion of academic credits required for graduation and reported changes in vocational enrollments between 1987 and 1992. There is a statistically significant but weak association between enrollment changes and increases in the proportion of academic credits needed to enter state university systems. However, the association is positive, suggesting that to the extent these university entrance requirements had any effect, it was to increase rather than decrease vocational enrollments.

Longer school years and site-based management programs are also positively associated with enrollment changes in regular districts, while parental choice plans are negatively associated with them. Once again, these associations are weak and difficult to interpret.

**Table 1.4**
**Correlations Between Education Reforms and Vocational Enrollments in Districts, 1987–88 Through 1991–92**

| | Regular | | Vocational | |
|---|---|---|---|---|
| | Correlation Coefficient | Significance Level | Correlation Coefficient | Significance Level |
| Increase in academic credits required for graduation | -.02 | .61 | .10 | .13 |
| Increase in academic credits needed to enter state university | .09 | .02 | .14 | .04 |
| Increase in academic credits needed for teacher certification | .05 | .20 | .11 | .10 |
| Mandate of longer school day | -.06 | .07 | .04 | .51 |
| Mandate of longer school year | .10 | .005 | .12 | .08 |
| Relaxation of state administrative rules for local districts | .00 | .93 | .01 | .82 |
| Elimination of BA in Education in state university system | .00 | .99 | .01 | .86 |
| Implementation of site-based management | .10 | .008 | -.01 | .83 |
| Establishment of parental choice plan | -.08 | .02 | .02 | .81 |
| Elimination of the general track | -.05 | .19 | -.03 | .64 |
| Requirement of proficiency or other exam for graduation | .06 | .09 | .06 | .33 |

Source: Omnibus District Survey, Version B and Vocational

On the whole, the analysis provides no substantial evidence that increased academic requirements caused vocational enrollments to decline between 1987 and 1992.

### Other Factors in the Decline of Vocational Education Enrollments

Given the conflict between informed opinion and these statistical data, the *Interim Report* observed that it was hard to reach any firm conclusions about the effects of educational reform on vocational enrollments.[16] Since that time, some

additional evidence suggests that factors other than academic reforms have been involved in the decline of vocational enrollments, whatever the role of these reforms.

First, as Figure 1.3 in Volume II shows, the decline in vocational enrollments began between 1979 and 1982, while the recent wave of reform was sparked by the publication of *A Nation at Risk* in 1983. Further, it took several more years for those academic reforms to affect school enrollments.

Second, the fact that vocational enrollments are declining most markedly in business and "trade and industry" programs, but have expanded in technical programs suggests that vocational enrollments may be responding to labor market trends. As Chapter 1 in Volume II notes, jobs for secretaries are declining, those for operatives, such as machinists and assembly line workers, are growing more slowly than the labor market as a whole, and those for technical workers are growing more rapidly.

## CAN REFORMS IN VOCATIONAL EDUCATION INCREASE ENROLLMENTS?

The Omnibus Survey data also enable us to address questions such as the following: Are Perkins reforms at the district level related to changes in enrollments? Is there any relation between other federal reform initiatives and vocational enrollments? Does state support for Perkins reforms affect enrollments? What effect, if any, do local program improvement efforts have? What is the relation between problems in vocational education and enrollments?

The data include many variables that could help explain vocational enrollment changes in local districts. Among other things, they include information on district demographics, Perkins reforms, other local program improvements, and perceived problems in vocational education. The *Interim Report* detailed these variables and hypothesized their effects on vocational enrollments. Many of these possible explanatory variables were eliminated in a preliminary screening based on Pearson correlations. Variables that showed no association or only a weak association with enrollment changes were excluded from further analysis. Only variables showing a moderate or strong, and highly significant, association ($r > .18$, $p < .0001$) with enrollment changes were retained. These remaining explanatory variables were included in a regression analysis.

### Multivariate Analysis of Factors Related to Vocational Enrollments

The results of the analysis are shown in Table 1.5. As expected, change in student enrollments is the most important predictor of change in vocational enrollments, and in this case a causal relation can be assumed with some confidence.

Among the policy variables, one Perkins reform — the number of steps taken to integrate academic and vocational education programs — is also significantly

**Table 1.5**
**Factors Related to Vocational Enrollments in Regular School Districts**

| Independent Variable | Regression Coefficient | Significance Level |
|---|---|---|
| Changes in total student enrollments | .43 | .0001 |
| Number of steps taken to integrate | .07 | .003 |
| State support for integrated programs | .17 | .05 |
| State support for assessment and accountability | -.09 | .35 |
| State leadership in general | .14 | .18 |
| Perceived effect of America 2000 on tech-prep efforts | .05 | .46 |
| Added career exploration | .30 | .0008 |
| Added student leadership programs | .31 | .0013 |
| Added job placement activities | -.07 | .44 |
| Problem with image of vocational education among students and parents | -.15 | .002 |

Source: Omnibus District Survey, Version B

related to enrollments. The more steps districts take to integrate their programs, the higher their vocational enrollments. Since the survey measures change in vocational enrollments by categories rather than by continuous numbers, we cannot say exactly how much change in enrollments is related to integration. However, we can say that **at a minimum**, each additional step taken to integrate is associated with a 1.4 percent increase in vocational enrollments.[17] Since there are ten steps listed in the survey, a shift from no integration to full integration is associated with an increase of at least 14 percent in vocational enrollments.

One plausible interpretation of these data is that integrated programs have drawing power. They may be more interesting to students who usually do not take many vocational courses. They may also have holding power in the sense that students who take one occupational course will be more interested in taking the next. It is more difficult to turn the explanation around — there is no obvious reason why increased vocational enrollments should cause districts to integrate their curricula. Nevertheless, other explanations for this association are possible and should not be discounted. For example, districts that are most strongly

committed to vocational education may have enrollment increases as a result of that commitment, and also may integrate programs for the same reason.

Information from the case studies supports the interpretation that integrated courses increase vocational enrollments. In the case study sites, the more rigorous applied academic courses, such as Principles of Technology, are popular and tend to attract higher achieving students who would not ordinarily take vocational education. (It should be added, though, that "PT" is sometimes counted as an academic course, rather than a vocational course.)

State and federal reform activities appear to have little or no direct effect on vocational enrollments. State leadership, state support for assessment, and perceived effects of America 2000 are not significantly associated with enrollment changes when the other factors are taken into account. State support for integrated programs shows a marginally significant relation to enrollments: An increase from "little or no support" to "very good support" is associated with an additional 3-percent increase in enrollments.[18]

A plausible explanation of these findings is that some federal and state education reforms have positive indirect effects on vocational enrollments. That is, federal and state reforms promote integration efforts in districts, and these local changes, in turn, tend to increase vocational enrollments. The data do not prove that this happens, but they are consistent with this explanation.

Local program improvements show significant positive associations with vocational enrollments, even after other factors are controlled. Adding or expanding career exploration programs and adding or expanding student leadership programs each are associated with a minimum 12 percent increase in vocational enrollments. On the other hand, the addition of job placement activities is not significantly related to enrollments after other factors are controlled. These findings suggest that some local program improvements may help increase vocational enrollments (or alternatively, that these programs are expanded in response to growing enrollments).

Finally, it is no surprise that problems with the image of vocational education among students and parents are significantly and negatively related to vocational enrollments. As the problems become progressively more serious, enrollments go down. A change from no problem to a serious problem is related to a minimum 9 percent enrollment decrease.

In all, the correlations and regression analyses suggest that the districts with unchanging vocational programs are losing vocational enrollments and those making improvements are gaining them. The data also suggest that improving programs and adopting integration may help to improve vocational enrollments.

**State Workforce Preparation Reforms**

Although the restructuring reforms in vocational education were stimulated by the earlier academic reforms, they have developed their own momentum, prompting new policy initiatives intended to overhaul secondary education in a number of states. Premo and Levesque have reviewed 20 states' efforts to improve students' workforce preparation.[19] Many of these reform initiatives are currently just recommendations, but in a number of states they have become official policy. Together they comprise a reform agenda that has much in common with the report of the Center on Education and the Economy, *America's Choice: High Skills or Low Wages*.[20] The list of reforms includes:

- Eliminating the general track.
- Building a common foundation: a rigorous core curriculum for all students through grade 10.
- Arranging for selection of a specialized program (e.g., college prep/academic or tech-prep/vocational) by prospective 11th- and 12th-graders.
- Providing career planning and guidance.
- Assessing and certifying students, notably at the end of grades 10 and 12.
- Integrating academic and vocational curricula.[21]
- Articulating secondary and postsecondary education through programs such as tech prep.
- Providing workplace linkages, including work experience programs.

Table 1.6, from the Premo and Levesque report, details the reform measures in the 20 states. The letter "P" in a cell indicates that the feature in the column was state policy as of April 1994; the letter "R" indicates that it was a recommendation. The number in the cell keys it to a brief description of a specific reform feature in a given state (see Appendix 1-B for descriptions). Eight states have been particularly active in generating reform policies: California, Florida, Maine, Oregon, Tennessee, Washington, Wisconsin, and Vermont.

The Oregon plan is perhaps the best known. It reflects many features of *America's Choice* and incorporates all the reform elements in Table 1.6. Oregon aims to eliminate the general track and expose all students to a common curriculum framework through grade 10. On completing the 10th grade, students will specialize, choosing either a college prep or occupational program. On the

**Table 1.6**

**Education Reform Measures in 20 States[a]: Recommendations and Policies**

| | Eliminating the General Track | | | Student Certification and Assessment | | School-to-Work | | |
|---|---|---|---|---|---|---|---|---|
| State[b] | Building a Common Foundation | Selecting a Specialization | Career Planning | Certification | Assessment | Integration of Academic and Voc. Ed. | Articulation With Postsec. Institutions | Work-place Linkages |
| Arkansas (1993) | | | | P (1) | | P (2) | P (3) | P (4) |
| California (7/93) | R (1) | P (2) | | P (3) | R (4) | P (5) | P (6) | P (7) |
| Florida (1993) | P (1) | | | | P (2) | P (3) | P (4) | P (5) |
| Georgia (1993) | | | | P (1) | | P (2) | P (3) | P (4) |
| Illinois (8/91) | | | | P (1) | | P (2) | P (3) | P (4) |
| Maine (1993) | | P (1) | P (2) | P (3) | P (4) | P (5) | P (6) | P (7) |
| Maryland (1993) | R (1) | | | | P (2) | | P (3) | P (4) |
| Michigan (5/91) | R (1) | | R (2) | | R (3) | | R (4) | R (5) |
| Minnesota (12/93) | P (1) | | P (2) | | | | P (3) | P (4) |
| New Jersey (1993) | | | | | | P (1) | P (2) | P (3) |
| New York (9/92) | R (1) | R (2) | R (3) | R (4) | R (5) | R (6) | R/P (7) | R (8) |
| Ohio (1993) | | | | | R (1) | | | R (2) |
| Oklahoma (1993) | | | | P (1) | | P (2) | P (3) | P (4) |
| Oregon (Fall 1993) | P (1) | P (2) | P (3) | P (4) | P (5) | P (6) | P (7) | P (8) |
| South Carolina (1993) | | | | | | | | |
| Tennessee (1992) | P (1) | P (2) | P (3) | | P (4) | P (5) | | P (6) |
| Texas (6/93) | | | | | | P (1) | P (2) | P (3) |
| Vermont (11/93) | P (1) | | | | P (2) | P (3) | P (4) | P (5) |
| Washington (1/94) | | P (1) | P (2) | P (3) | P (4) | P (5) | P (6) | P (7) |
| Wisconsin (1993) | P (1) | R (2) | | R/P (3) | P (4) | | P (5) | P (6) |

P = Official policy. R = Still in recommendation stage.

[a] The number in a cell keys it to a brief description of a specific reform in the given state. The descriptions are contained in Appendix 1-B.

[b] Including the date of publication for the most recent sources used.

Source: Premo & Levesque (1994)

occupational side, six industry-based majors are currently envisioned: Arts and Communication; Business and Management; Health Services; Human Resources; Industrial and Engineering Systems, and Natural Resources Systems. Student performance will be assessed at the end of grades 10 and 12. A Certificate of Initial Mastery will be awarded upon successful completion of grade 10 and the grade 10 assessment; a Certificate of Advanced Mastery, upon successful completion of the specialization period in grade 12 and the grade 12 assessment.

The new system will stress applied learning throughout high school. Beginning in the specialization period, a Tech-Prep Associate Degree program (TPAD) will link high school and community college programs, and workplace training will complement classroom instruction.

Oregon is currently piloting its program in six high schools, and information from these trial runs will no doubt lead to some modification of the plan before it is implemented on a statewide basis.

**Federal Workforce Preparation Reforms**

The movement to improve the workforce preparation of the nation's students is also reflected in recent federal education reform initiatives other than the Perkins Act. The recently enacted School-to-Work Opportunities Act provides grants to states to plan and implement comprehensive workforce preparation programs. These programs include school-based and work-based components, with links between academic and vocational education (integration); between secondary and postsecondary institutions (tech prep); and between school and work, especially work experience programs such as youth apprenticeship.

To get the process started, the Departments of Education and Labor provided funds for planning grants to all states in 1993, and implementation grants to some five to eight states. Additional states will receive implementation grants in the next several years.

The federal government is also underwriting the development of standards for occupational education and training. Title IV of the 1994 Goals 2000: Educate America Act establishes a National Skill Standard Board "to serve as a catalyst in stimulating the development and adoption of a voluntary system of skill standards and of assessment and certification of skill standards."[22]

Prior to the passage of the Goals 2000 law, the Departments of Education and Labor awarded grants for the development of standards in 21 industries, including metalworking, electronics, automotive, retail trade, and human services, to name but a few.[23] (There are 22 grants in all, two to electronics associations. See Appendix 1-C.)

## CONCLUSION

Beginning in the 1980s, American secondary education underwent two waves of reform. The first wave, set forth in *A Nation at Risk*, focused on the improvement of academics and implicitly on college-bound students. The second wave, called "restructuring reform," was in large part a response to the perceived shortcomings of the first. Many, but not all, second-wave reforms focused on preparing non-college-bound youth for occupations and careers.

The Perkins Act's requirement for performance standards is derived from the first wave of reform. The Act's emphasis on integration, tech prep, and work experience programs is part of the second wave. Together, these three innovations are key elements in the "school-to-work transition."

Multivariate analysis suggests that the Perkins Act is effective in promoting integration and tech prep in local districts. Independent of the Perkins Act, state agencies also seem to be effective in promoting integration and performance standards: Districts that say they receive strong support from their states tend to be more active in integrating and in developing performance standards.

One often debated question about education reform is its effect on vocational enrollments. Vocational administrators believe that the Wave I reforms, and especially increased academic requirements for graduation, have reduced vocational enrollments by reducing the amount of time available to students for electives. Our case studies and opinion data from the Omnibus Survey also indicated this effect. However, statistical analysis of Omnibus Survey data shows no relation between increased academic requirements and changes in vocational enrollments between 1987 and 1992. While the *Interim Report* reached no conclusion about the effects of academic reform on vocational enrollment declines, additional information suggests that other factors are involved, regardless of the role of academic reform. The decline started before the academic reform movement and enrollment changes seem to parallel changes in demand in the labor market. This suggests that some skills traditionally provided by secondary vocational education may be becoming less relevant to the labor market.

Some Wave II reforms and program improvement efforts are associated with increased vocational enrollments: (a) the integration of academic and vocational education; (b) increased state support for integration; (c) career exploration programs; and (d) student leadership programs. The evidence is consistent with the hypothesis that reforms and improvements such as these can help increase vocational enrollments.

The movement to promote occupationally oriented second-wave reforms is spreading. A number of states have adopted policies intended to transform the workforce preparation of secondary students, and more are considering

recommendations to do so. At the federal level, the Administration prepared the School-to Work Opportunities Act; included a National Skill Standards Board in the Goals 2000: Educate America Act; provided school-to-work transition grants; and funded the development of occupational skill standards in selected industries.

**State leadership seems to be an effective way of bringing about structural reforms in local districts. We recommend that the Perkins Act encourage state education agencies to undertake leadership in developing restructuring reforms that will substantially improve the preparation of students for the workforce.** As Chapter 4 notes, promoting reform primarily through vocational education agencies or departments sometimes puts vocational educators in the position of seeking changes from system administrators who are more concerned with other issues. **Therefore we recommend that Perkins seek to enlist the energies of the state education establishment as a whole in pursuing structural reforms. One way to do this would be to set aside some portion of basic grant money for competitive grants to states that want to assume such leadership roles and can demonstrate the potential to do so.**

## ENDNOTES

1 Section 403 (b) (5) (A).

2 The discussion of the recent history of education reform draws heavily on M. Asche et al. (1993), *The Impact of Educational Reform on Vocational Education*, National Center for Research in Vocational Education.

3 National Commission on Excellence in Education (1983), *A Nation at Risk: The Imperative for Educational Reform*, U.S. Department of Education.

4 Chance, W. (1988), *The Best of Educations*, Education Commission of the States, cited in Asche et al., p. 6.

5 Apart from reforms existing in 1991–92 or planned for the future, a third response option, indicating that a reform had not occurred and was not likely to occur, is omitted from this table. If it were included, the three columns would total 100%.

6 The National Assessment's recent literature review on education reform notes that the provision for core standards and measures "incorporates the outcomes accountability concept inherent in the earlier standards and testing reform initiatives but also reflects awareness of the latter [restructuring] reforms in that localities are guaranteed the opportunity to modify and adapt state-developed core standards and measures to local needs and conditions." (The restructuring lies in the devolution of responsibility from the states to the localities.) See Asche et al., p. 22.

7 This discussion of *A Nation at Risk* and the subsequent report of the National Commission on Secondary Vocational Education draw upon a report by N.E. Adelman (1989), *The Case for Integrating Academic and Vocational Education*, pp. 1-2, Vocational Education Analysis and Support Center.

8 The National Commission on Secondary Vocational Education (1984), *The Unfinished Agenda: The Role of Vocational Education in High School*, National Center for Research in Vocational Education.

9 Parnell, D. (1985), *The Neglected Majority*, Community College Press.

10 Ibid., pp. 120–122.

11 Secretary's Commission on Achieving Necessary Skills (1991), *What Work Requires of Schools*, U.S. Department of Labor.

12 See Table 1.1 for academic and restructuring reforms. As a preliminary step in the analysis, a number of "federal" and "state" variables expected to be related to the implementation of integration, tech prep, and performance standards were correlated with these outcome variables. Those strongly and significantly related to the outcome variables were selected for inclusion in the regression analyses. First, however, independent variables that were strongly intercorrelated were combined into single variables.

13 Two scales measure the extent of perceived Perkins (and other) influences—one on integration and one on tech prep in local districts. The question asks district administrators

whether a given reform effort, such as Perkins, was "instrumental in your district's current efforts" to integrate or to develop a tech-prep program. There are three intervals on the scale between "not at all" instrumental and "largely" instrumental. Multiplying the regression coefficient by 3 yields the estimated "effect" of perceived influence in terms of increased number of steps to integrate or to develop tech prep.

14 The General Accounting Office found this pattern in analyzing data for its report on secondary vocational education, *Vocational Education: Status in School Year 1990–91 and Early Signs of Change at the Secondary Level* (1993c). Personal communication with Tom Hubbs, October 1993.

15 Milne, A., Martindale, M., & Michie, J. (1993), *Vocational Education in Communities*, p. 12, Westat.

16 U.S. Department of Education (1994), *National Assessment of Vocational Education: Interim Report to Congress*, pp. 273–279.

17 The regression coefficient (.07) applies to each of four increments on a 5-point scale. Each increment equals at least a 5% change in enrollments. Thus, 4 (.07) (.05)=.014.

18 The regression coefficient (.14) applies to each of four increments on the 5-point scale. Each increment equals at least a 5% change in enrollments. Thus 4 (.14) (.05) = .028.

19 Premo, M., & Levesque, K. (1994), *State School Reforms for the Non-College-Bound*, MPR Associates.

20 National Center on Education and the Economy (1990), *America's Choice: High Skills or Low Wages*, Commission on the Skills of the American Workforce.

21 Integration is not broken out as a separate reform in Premo and Levesque, but it is a feature of the educational processes in many of the other reforms.

22 Section 502 of the Goals 2000: Educate America Act.

23 Hoachlander, E.G. & Rahn, M. (1994, January), National Skill Standards, *Vocational Education Journal*, 69, pp. 20ff.

# CHAPTER 2

# PERFORMANCE MEASURES AND STANDARDS

## INTRODUCTION

The 1990 Perkins Act requires states to implement systems of core measures and standards for assessing the performance of secondary and postsecondary vocational education programs by fall 1992. The Act also calls upon the National Assessment of Vocational Education to assess "the effect of performance standards and other measures of accountability on the delivery of vocational education services."[1] It is still too early for these systems to have had much impact on the delivery of services, but we can assess implementation of Perkins-mandated performance assessment systems at the state and local levels.

So far, in developing their systems of measures and standards, states have adopted widely varying approaches. Some have taken a centralized approach to designing their measures, prescribing specific assessment instruments or data collection procedures to be used by local recipients, while others used a more decentralized strategy, allowing local recipients to choose specific instruments or procedures. Still others have adopted a mixed approach, prescribing the requirements on some measures and allowing flexibility on others. Some states collect local performance data through a central office, while others leave data collection and analysis primarily to local education agencies. The extent of centralization generally depends on the availability of assessment instruments, the pre-existence of statewide procedures for monitoring vocational program performance, and state-level governance policies.[2]

The progress of local districts and schools in implementing performance systems depends on prior state-level development and adoption of the systems' components, so local implementation necessarily lags behind state action. Perkins required state agencies to finalize their measures and standards by fall 1992; in the brief time since then local education agencies have nevertheless taken steps in implementing changes in response to these systems. Progress varies between secondary districts and postsecondary institutions, and it varies across different accountability-related activities.

This chapter relies primarily on two data sources: the National Assessment of Vocational Education's 1993 Followup Survey; and Rahn, Hoachlander, and Levesque's *State Systems for Accountability in Vocational Education*.[3] These two sources provide the most recent information available at the national level on accountability systems. The Followup Survey gathered information from state and local vocational education administrators on several topics including performance measurement, and followed the original Omnibus Survey administered in 1992; the Followup Survey is discussed in more detail in the

Technical Appendix (Volume V). The *State Systems* report collected state-level data on accountability systems only, using interviews, workshop discussions, and analysis of state agency documentation.

This chapter is divided into three parts. The first summarizes states' progress in developing and implementing a system of performance measures and standards as required by the Perkins Act. The second explores the progress made at the local level in implementing these systems. The third provides an overview of the current status of performance measures and standards and identifies areas in which these systems need further development.

## STATES' PROGRESS IN IMPLEMENTATION

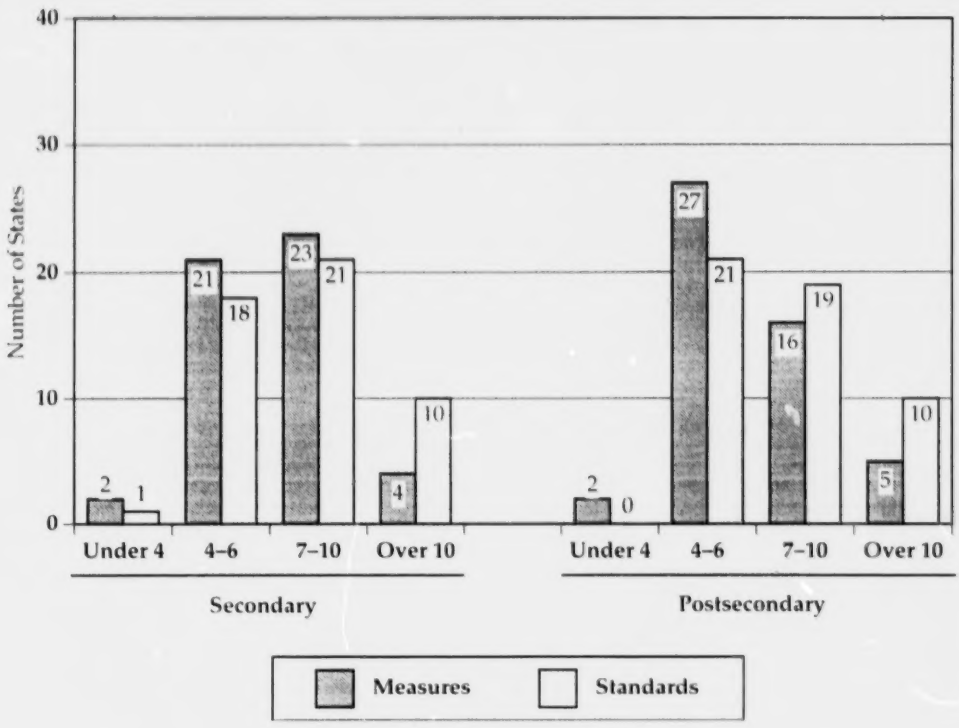
### Status of State Accountability Systems

The emphasis in Perkins on planning, evaluation, and accountability is not entirely new to federal policy on vocational education. Beginning with the Vocational Education Act in 1963, states have been required to develop state plans and conduct program evaluations. Nor is the 1990 legislation the first to require that attention be paid to student outcomes in evaluating programs. For many years, federal law has encouraged using **labor market outcomes** — such as placement rates or employer satisfaction — in assessing vocational education programs.[4] The 1990 Perkins Act requires states to make more effective use of labor market outcomes and also to use **learning outcomes** — measures of academic and occupational competencies — in assessing program effectiveness.

Perkins performance systems had to include at least two measures of performance by fall 1992.[5] One was a measure of "learning and competency gains, including student progress in the achievement of basic and more advanced academic skills." The second was to include one of the following: (a) occupational competency attainment; (b) job or work skill attainment; (c) retention in school; or (d) placement in further education, the military, or employment. The Act also specified that these systems include appropriate adjustments and incentives for encouraging the provision of services to students with special needs. Programs that consistently perform below standard on the state assessment system for three years are required to develop local program improvement plans, in collaboration with the state.

All states have implemented more than the two measures and standards required by the Perkins Act. In fact, many states have gone well beyond the minimum requirements of Perkins by incorporating all five of the measures outlined in the law — and in some cases, even more — into their accountability systems (Figure 2.1). Each state has tried to create a comprehensive system of accountability (see Appendix Tables A-2.1, A-2.2, and A-2.3). Almost all

**Figure 2.1**
**Number of Measures and Standards Included in States' Accountability Systems**




NOTE: Information was collected from all 50 states, but not from the District of Columbia.

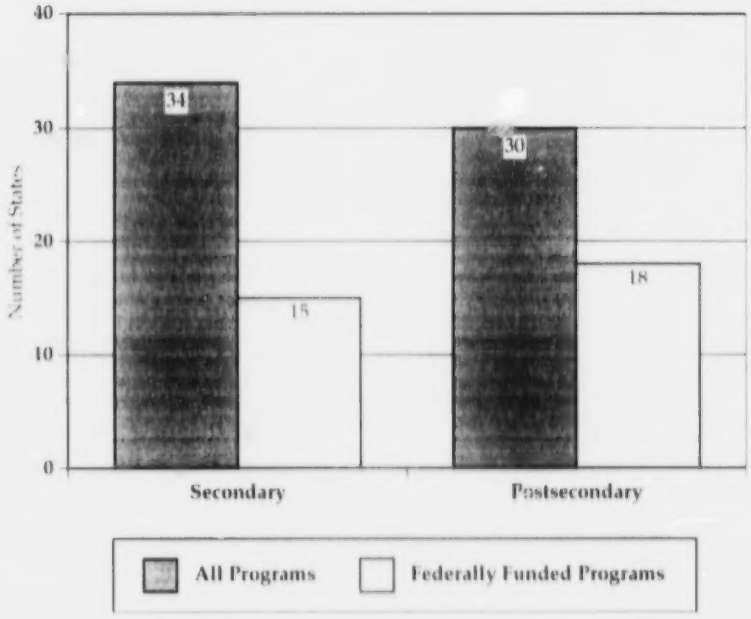
Source: Rahn, Hoachlander, & Levesque (1992)

measures and standards in each system are outcome-based, with a few states including supplemental process-oriented standards. However, to date, none of the systems is complete, and at both the secondary and postsecondary levels, each state is actively working on components of its system. While many states need to gather baseline data in order to set standards, others are struggling with the quality of the data they have collected and plan to collect. Currently, some states are working on phasing in additional measures and standards as competencies or assessment instruments (or both) become available. In short, each state system will continue to evolve over time.

Rahn, Hoachlander, and Levesque found that by the end of 1992, more than half of the states (27) had at least two systems of performance measures and standards in place — one for secondary and one for postsecondary vocational

education. Some states had adopted different measures and standards for adult education or area vocational–technical schools. Perkins regulations require states to apply their measures and standards only to federally funded programs. However, this requirement was clarified late in the regulatory process, and many state-level administrators opted to apply measures more broadly. As a result, most states have designed their accountability systems to evaluate the performance of all students in vocational education programs (Figure 2.2). Thirty-four states report data for all students participating in vocational education programs at the secondary level, while 15 states report them only for those students participating in vocational education programs that receive Perkins funding. In postsecondary education, 30 states report data for all students participating in vocational education programs, whereas 18 states report only for those students in Perkins-funded programs.

**Figure 2.2**
**Number of States Applying Performance Measures and Standards to All Programs or to Only Federally Funded Programs**




NOTE: States do not sum to 51 (secondary) or 50 (postsecondary) because another possible response was "other."

Source: 1993 Followup Surveys of State Secondary and Postsecondary Agencies (hereafter, 1993 Followup Surveys of State Agencies)

## Outcome Areas to be Measured

In selecting performance measures, state education agencies were directed to choose outcomes that met federal requirements and reflected their state goals for vocational education. The National Center for Research in Vocational Education has defined an **outcome** as "a measurable aspect of student performance."[6] A **measure** indicates how an outcome is to be assessed quantitatively, whereas a **standard** represents the criterion against which actual performance on the measure is to be evaluated. An example of a measure is the percentage of students in a program who achieve a certain level on the statewide competency test. The standard provides the actual percentage and level expected — for example, 80 percent of the students in a program will perform at or above the 80th percentile on the statewide competency test. The following sections describe how states measure particular learning and labor market outcomes.

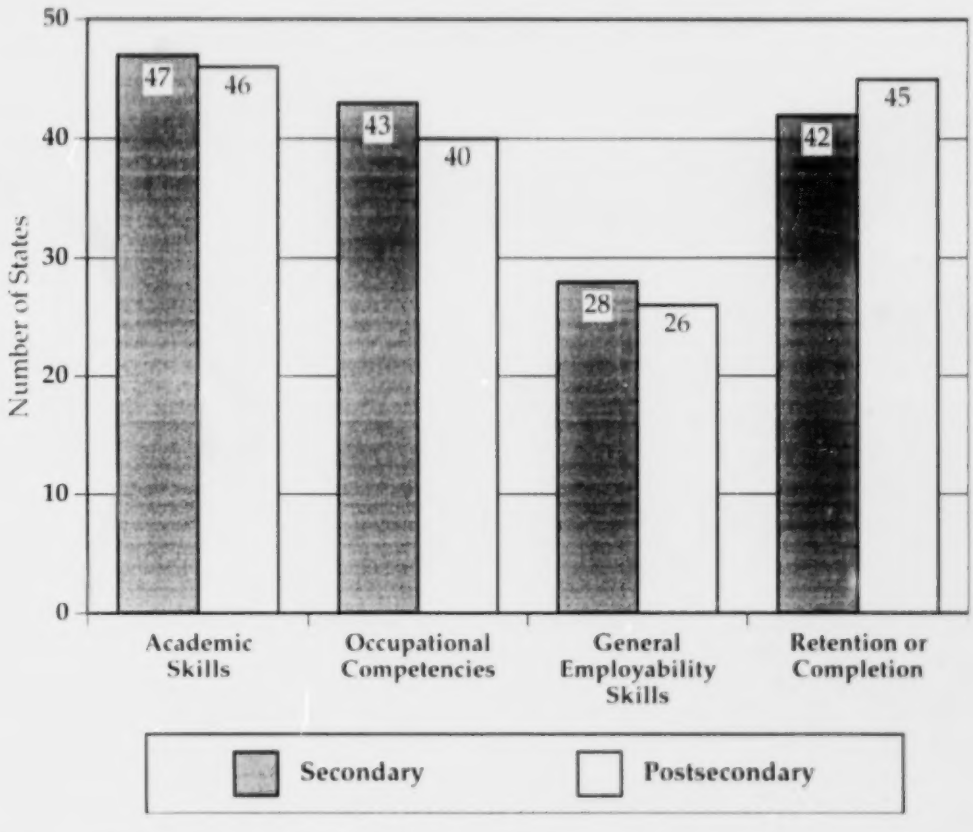
### *Learning Outcomes*

The Perkins Act requires that states implement "measures of learning and competency gains, including student progress in the achievement of basic and more advanced academic skills." In addition to requiring measures of academic skills, the language also allows for measures of occupational competency. Since a major purpose of vocational education is to prepare students for employment, occupational competency measures are obviously desirable. Although valid standardized tests for basic and advanced academic skills exist, states often lack access to appropriate, reliable **occupational competency** tests. In general, little validity or reliability testing has been done with occupational skill assessments. Consequently, states have implemented few measures of occupational skills or skill gain.

Many states are awaiting the development of national industry skill standards, while others have started to develop their own statewide standards (e.g., Illinois and Texas). The U.S. Departments of Education and Labor have funded 22 projects to develop industry-specific skill standards and certification systems (see Appendix 1-C); however, the final products of these efforts are a long way off. As a result, many states are forced to rely on local instructors' judgments of students' occupational gain or on program completion data until national or statewide assessments become available.

In spite of this limitation, most states are assessing students' academic and occupational competencies. By 1993, at the secondary level, nearly all states measured academic skills (47),[7] occupational competency attainment (43), and retention in or completion of a vocational program or secondary school (42), while 28 states measured general employability skills (Figure 2.3). The number of states using these measures was similar at the postsecondary level; academic skills are measured by 46 states, occupational competencies by 40 states, retention or completion by 45 states, and general employability skills by 26 states.

**Figure 2.3**
**Number of States Measuring Performance on Each Learning Outcome**




Source: 1993 Followup Surveys of State Agencies

(See Appendix Tables A-2.4 through A-2.7 for a summary of the measures used by the states to assess academic and occupational skills.)

In secondary vocational education, about half of the states measure academic skills by using a one-time required test (see Table A-2.6 in the Appendix). Other states have implemented a measure that requires a pretest and posttest to demonstrate individual student gain, while still others will be using course completion rates as a proxy for academic skill gain. At the postsecondary level, states' methods for measuring academic gain are less uniform (see Appendix Table A-2.7). Whereas most states intend to measure academic gain in secondary vocational education by using a test instrument, many states set completion of specific basic and advanced courses as measures at the postsecondary level. A number of states left the choice of assessment instruments and measurement

tools up to local school districts and postsecondary institutions. Where states' governance structures were based on local control, prescribing an instrument would not have been appropriate.

### *Labor Market Outcomes*

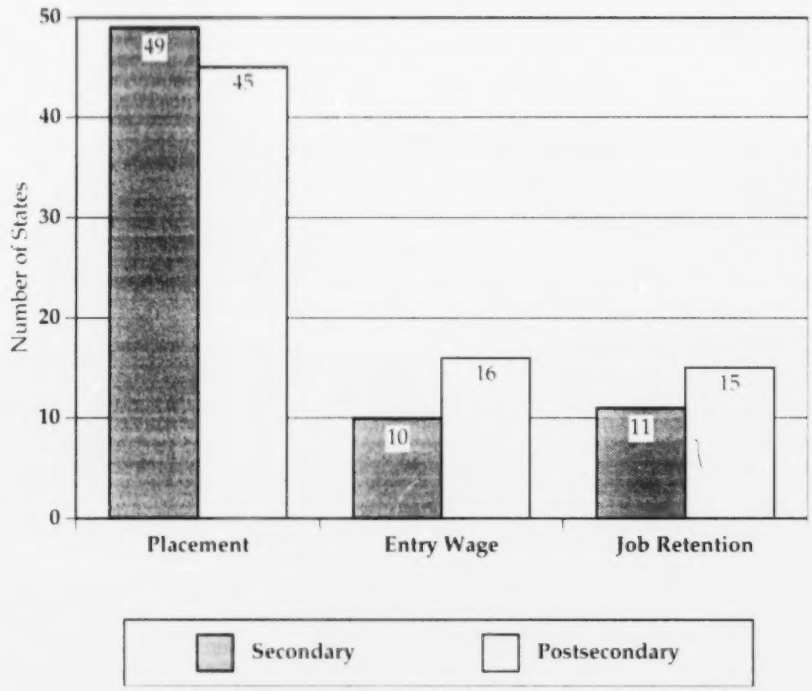
Placement rates were the primary measure of labor market outcomes used by states in 1993; wages and job retention were less often used. (Included in placement measures are factors such as joining the military and enrolling in further education/training, as well as job placement.) Almost all states (49) used placements to measure the labor market outcomes of secondary vocational program completers (Figure 2.4); 40 states used **training related** placements as a measure. Entry wage and job retention measures were used by few states at the secondary level. In general, states' use of each employment measure differed little between the secondary and postsecondary levels. Most states (45) used placement to measure the labor market outcomes of postsecondary vocational program completers, whereas fewer (only about one-third of states) used entry wage or job retention. Given the importance of finding training-related jobs, the emphasis on placement in such jobs as an outcome measure is appropriate.

## Service to Special Populations

By 1992, most state agencies were developing the capacity to disaggregate performance data in order to measure the performance of Perkins-defined special population groups, using learning and labor market outcomes.[8] By the end of that year, about half of the states could document the specific performance of special populations for each standard they had implemented. The difficulty in disaggregating data on special populations can be attributed to the data collection procedures used under the original Perkins Act (1984), which did not require that data for all special population groups be collected.[9] Many states are currently revamping their data systems in order to meet the requirements of the 1990 Perkins Act.

Perkins requires states to establish incentives or adjustments for special populations in their statewide accountability systems. A common response of state directors to the question of providing **incentives** to serve special populations is that because Perkins funds are targeted toward special populations, these funds alone provide such an incentive.[10] A frequent comment about making **adjustments** for special populations is that most of the Perkins funds are used to supplement instruction for special populations with services such as counseling or instructional aids, and that these constitute programmatic adjustments. Currently, few states have actually implemented incentives or adjustments for special populations within their accountability systems. However, most states reported in 1992 that they planned to work on the special populations component of their accountability systems during 1993.

**Figure 2.4**
**Number of States Measuring Performance on Each Labor Market Outcome**




Source: 1993 Followup Surveys of State Agencies

By spring 1993, many (but not most) states had begun to work on procedures for adjusting performance measures and standards for special populations. The special population group for which these procedures have been established most often is disabled students, followed by disadvantaged and limited-English-proficient students, in both secondary and postsecondary systems (Table 2.1). In general, more states were making progress in this area at the secondary level than at the postsecondary level.

### Local Modifications

Many state agencies have not yet determined whether local modifications to standards and measures are warranted, although most have developed (or plan to develop) procedures for local entities to apply for modifications, and criteria for approving these applications. Table 2.1 shows that a minority of states provide for local modifications, and about one-tenth are in the process of developing such provisions. In states with highly decentralized systems of

**Table 2.1**
**States' Progress in Establishing Procedures for Adjusting Performance Measures and Standards for Special Populations and Local Modifications, as of 1993**

| | Number of State Secondary Agencies | | | Number of State Postsecondary Agencies | | |
|---|---|---|---|---|---|---|
| | Yes | No | In Process | Yes | No | In Process |
| Adjustments for special populations: | | | | | | |
| Disabled students | 20 | 28 | 3 | 14 | 31 | 5 |
| Disadvantaged students | 16 | 32 | 3 | 13 | 32 | 5 |
| LEP students | 16 | 31 | 4 | 13 | 32 | 5 |
| Other special population students | 3 | 47 | 1 | 5 | 43 | 2 |
| Local modifications: | | | | | | |
| School resources | 9 | 37 | 5 | 6 | 40 | 4 |
| Local labor market | 13 | 34 | 4 | 10 | 35 | 5 |

Source: 1993 Followup Surveys of State Agencies

measures and standards, administrators may not see any need for local modifications. In these states, local districts or institutions usually choose the assessment instruments and measurement tools that fit their needs; thus, the entire system is locally modified. Whether such arrangements are consistent with the Perkins Act is a question that should be addressed. The Act calls for "a statewide system of core standards and measures." In these highly decentralized states, it is unclear how much of a statewide system exists.

### Coordination With Other Federal Programs

All states reported that the development of their performance measurement system involved some form of coordination with other programs receiving federal assistance, as required by Perkins, although the extent of this coordination varied among states. Most states indicated that they had included a

representative from JTPA (Job Training Partnership Act) on their Committee of Practitioners (which reviews the state plan for the performance assessment system). Those states that reviewed JTPA performance standards to assess the possibility of adopting or modifying them to meet Perkins requirements concluded that the JTPA standards would not be suitable for such purposes.[11]

## LOCAL PROGRESS IN IMPLEMENTATION

This section discusses several issues related to local activities, including:

- Local accountability systems.
- Local data collection and reporting in response to the Perkins Act.
- Local assessment methods.
- Support for local implementation efforts.

### Existing Accountability Systems

A recent study of local accountability systems in vocational education concluded that the functioning of local systems is crucial to improving programs and that the Perkins Act places a range of new accountability responsibilities on both local and state education agencies.[12] Indeed, these analysts wrote, "Local accountability systems are the linchpin of Perkins II — local program improvement hinges upon their success or failure."

States had nearly two years after the Perkins reauthorization to develop their systems of performance measures and standards before beginning to implement them by September 1992. While state-level administrators were developing accountability systems, local administrators worked on implementing other Perkins priorities, such as integration and tech prep. Since planning time to develop an accountability system was necessary, some delay between state adoption of new policies and local implementation is to be expected. Therefore, to date, the effects of the systems at the local level are limited.

Implementation of accountability systems at **both** the state and local levels was in its first year when much of the data used in this chapter was collected.[13] In fact in some states, local Perkins recipients were not asked to collect performance data until the end of the school year 1993–94, about a year after data from the Followup Survey were collected. The *Interim Report* showed that in 1992 state agencies were devoting considerable resources to the development of systems of accountability.[14] In contrast, local agencies focused more attention on integrating vocational–technical and academic curricula and on developing tech-prep programs. However, some progress had been made by 1993 in implementing performance assessment at the local level, as this section describes. This progress

is particularly notable because the Omnibus Survey, conducted in 1992, showed that local education agencies, especially secondary districts, had taken relatively few steps to implement measures and standards.

Stecher and Hanser found that functioning local accountability systems existed before the 1990 Perkins Act, but these systems tended to rely on education inputs and labor market outcomes — such as enrollment, program completion, and job placement rates — to monitor student progress, rather than on learning outcomes. Although these systems were consistent with the concepts underlying the Perkins Act, the requirement to measure learning outcomes, both academic and occupational, was a fundamental change.

### Local Data Collection and Reporting

Local education agencies were already collecting data on student outcomes such as completion/retention and placement rates in 1992; for many measures, more than 90 percent did so.[15] These collection efforts formed a foundation upon which local agencies could build in responding to Perkins provisions. Nevertheless, as Table 2.2. shows, there were noticeable increases between 1992 and 1993 in the percentages of secondary districts and postsecondary institutions reporting these data to their state agencies (1993 was the first year in which Perkins required this). Reporting of learning and competency measures increased the most, mainly because localities had not been required to report on them before 1992.

By 1993, localities were collecting and reporting data on a wide range of performance measures (Table 2.2). These localities were very likely to report information on course/program completion or school retention. More than 85 percent of postsecondary institutions reported data on graduation or retention rates, while only 36 percent reported data on advanced academic skills. Secondary districts also emphasized graduation or retention rates, but were more likely than postsecondary institutions to report data on basic and advanced academic skills and general employability skills.

### Local Assessment Methods

How are localities collecting these data? We have information with which to address this issue at the secondary level.

As Table 2.3 illustrates, the methods that secondary districts used in 1991–92 for testing academic and occupational skills tended to be informal.[16] (The three methods other than commercially and state-developed tests are counted as informal here.) Standardized tests, whether developed by a commercial firm or state or local agencies, were used by less than half of the districts to test basic or advanced academic skills or occupational skills; this was true of both regular and vocational districts.

**Table 2.2**
**Percent of Secondary Districts and Postsecondary Institutions Reporting Performance Data to the State Education Agency in 1992 and 1993**

| | Secondary Districts | | Postsecondary Institutions | |
|---|---|---|---|---|
| | 1992 | 1993 | 1992 | 1993 |
| Student learning/competency measures | | | | |
| Basic academic skills | 47 | 65 | 34 | 57 |
| Advanced academic skills | 32 | 48 | 12 | 36 |
| Occupational competencies or skills | 32 | 48 | 17 | 50 |
| General employability/work readiness skills | 25 | 39 | 12 | 37 |
| Retention/completion measures | | | | |
| Course completion rates | 63 | 74 | 51 | 66 |
| Vocational program completion rates | 65 | 77 | 71 | 85 |
| Certification rates | 30 | 44 | 58 | 75 |
| Graduation or retention rates[a] | — | 82 | — | 87 |
| Graduation rates | 72 | — | 74 | — |
| Retention rates | 65 | — | 52 | — |
| Placement/followup measures | | | | |
| Training-related employment specifically | 45 | 59 | 61 | 66 |
| Employment generally | 51 | 64 | 68 | 69 |
| Military service | 47 | 64 | 44 | 56 |
| Additional training or education | 49 | 64 | 51 | 63 |
| Entry wage | 24 | 36 | 48 | 48 |

[a] The 1992 Omnibus Survey asked about graduation and retention rates separately.

Sources: 1992 Omnibus Survey and 1993 Followup Survey of Secondary Districts and of Postsecondary Institutions

**Table 2.3**
**Percent of Secondary Districts Using Various Methods to Measure Students' Skills, 1991–92**

| Method | Basic Academic Skills | Advanced Academic Skills | Occupational Skills |
|---|---|---|---|
| Regular secondary districts | | | |
| Any measure | 51 | 41 | 36 |
| Commercially developed test | 39 | 32 | 12 |
| State-developed test | 33 | 21 | 12 |
| Locally developed test | 19 | 14 | 16 |
| Informal teacher judgment | 39 | 32 | 30 |
| Teacher ratings | 42 | 33 | 31 |
| Vocational districts | | | |
| Any measure | 62 | 31 | 74 |
| Commercially developed test | 43 | 16 | 26 |
| State-developed test | 26 | 10 | 31 |
| Locally developed test | 26 | 11 | 51 |
| Informal teacher judgment | 42 | 18 | 56 |
| Teacher ratings | 45 | 22 | 68 |

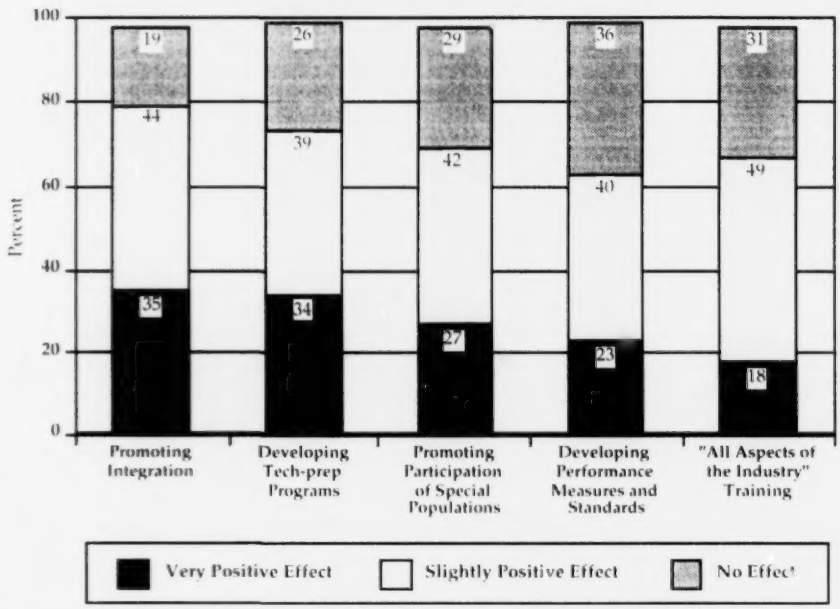
Source: *Interim Report* 1994, p. 296, based on data from the 1992 Omnibus Surveys of Regular and Vocational Secondary Districts.

The term "locally developed tests" encompasses a range of different methods and may include anything from written tests to teacher judgments, course completion, and portfolios. Thus, while locally developed tests were used by just over half of vocational districts to assess occupational skills, it is not clear what measurement tools these were. Although formal teacher ratings of students and informal teacher judgments were somewhat more commonly used, they were still not widespread. The infrequency of standardized occupational skills testing can be explained partly by the lack of valid, reliable tests in this area (as discussed in the section on States' Progress in Implementation). Whatever the cause, state and local agencies have a good deal of work to do before testing of these skills can be applied widely.

## Effects of the Perkins Act on Assessment

Although the 1990 Perkins Act was generally given high marks by local vocational educators, they were less likely to think that the law had a positive effect on the development of performance measures and standards than on other aspects of vocational education. Of five such aspects influenced by Perkins, developing a state accountability system received the second lowest percentage rating for "very positive effect" from both secondary and postsecondary administrators (see Figures 2.5 and 2.6). (This result may partly reflect the disinclination of local administrators to view state assessment of their programs as positive.) Nevertheless, the administrators tended to think that the overall effect of Perkins on performance assessment systems was positive: Approximately two-thirds of secondary and of postsecondary administrators were of this opinion.

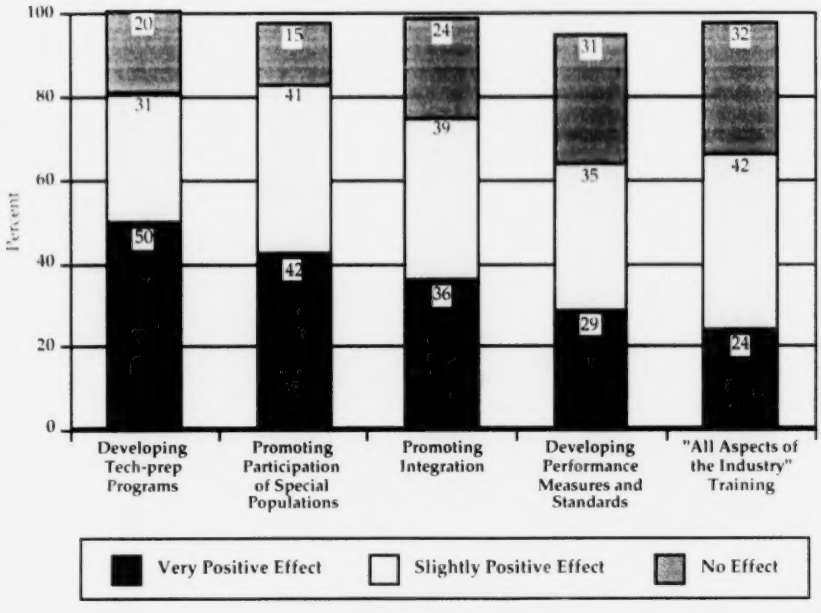
**Figure 2.5**
**Percent of Secondary District Administrators Reporting That the 1990 Perkins Act Had Positive Effect or No Effect on Each Vocational Program Effort, as of 1993**




NOTE: Percentages do not sum to 100 because respondents could also choose "slightly negative" or "very negative" effect; these percentages are not shown.

Source: 1993 Follow-up Survey of Secondary Districts

**Figure 2.6**
**Percent of Postsecondary Institution Administrators Reporting That the 1990 Perkins Act Had Positive Effect or No Effect on Each Vocational Program Effort, as of 1993**




NOTE: Percentages may not sum to 100 because respondents could also choose "slightly negative" or "very negative" effect; these percentages are not shown.

Source: 1993 Followup Survey of Postsecondary Institutions

Around one-third of these administrators reported that Perkins had no effect on developing performance measures and standards. Both district and postsecondary administrators credit Perkins with having more of an effect on integration and tech prep results, probably because programmatic changes in these two areas were required of local agencies earlier than for performance standards. Therefore, when these data were collected in 1993, most local agencies had spent less time working on accountability systems than on integration and tech prep.

### Support for Local Implementation Efforts

Secondary school district administrators were also asked about change from 1990 to 1993 in **state support** for various vocational efforts. Almost three-quarters of the respondents said there was at least some increase in state support for

program assessment and accountability, and 24 percent each perceived "no change." Reports of decreases in state-level support were minimal (Table 2.4).

The emphasis on measuring learning outcomes in state performance measurement systems requires that technical assistance be given to localities. Local administrators and teachers need to understand the purposes and goals of the assessment system, how to implement new forms of assessment, and how to (or how the state will) interpret and use the results of the assessment. To meet these needs, localities are receiving a relatively high level of in-service

**Table 2.4**
**Percent of Secondary Districts Reporting Levels of Change in State Support for Vocational Education Activities, 1990 to 1993**

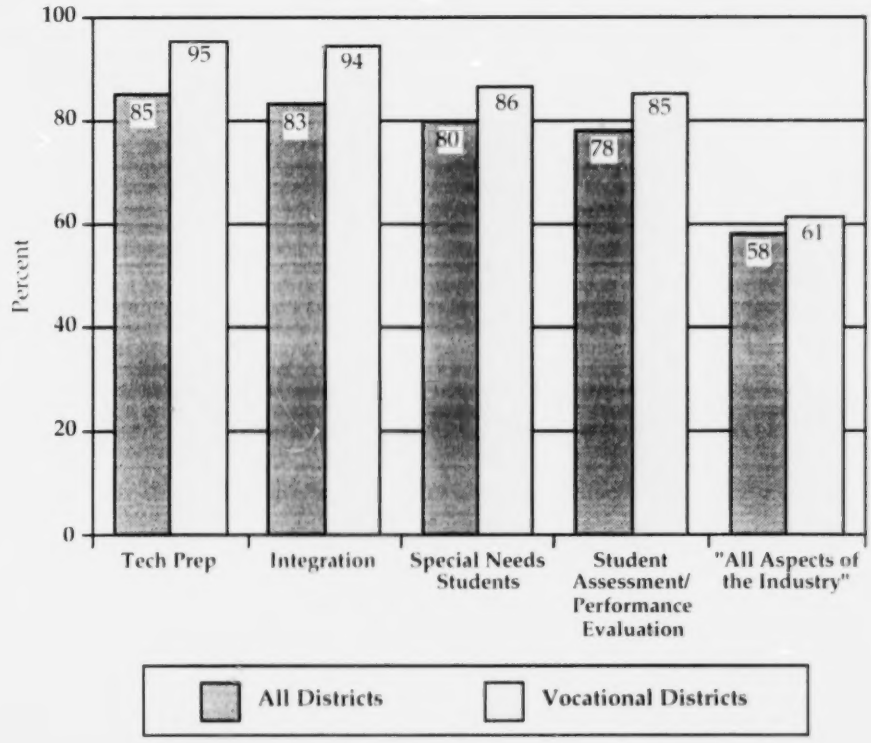
| | Extent of Change in State Support | | | | |
|---|---|---|---|---|---|
| | Large Increase | Some Increase | No Change | Some Decrease | Large Decrease |
| Development of tech-prep programs | 35 | 44 | 19 | 1 | 1 |
| Vocational program assessment and accountability | 24 | 49 | 24 | 2 | 1 |
| Development of integrated vocational-academic programs | 19 | 55 | 24 | 2 | 1 |
| Guidance on procedures for assuring equal access to vocational services and programs | 19 | 51 | 26 | 3 | 1 |
| Development of "all aspects of the industry" curricula | 11 | 52 | 35 | 3 | 1 |
| State leadership in general | 16 | 48 | 24 | 7 | 4 |

NOTE: Percentages may not sum to 100 due to rounding.

Source: 1993 Followup Survey of Secondary Districts

training concerning student assessment and performance evaluation (Figure 2.7). Although tech prep and integration are the most common Perkins-related in-service topics (offered in 85 and 83 percent of districts), student assessment falls not far behind; this in-service topic was covered in 78 percent of districts in 1992–93.

**Figure 2.7**
**Percent of Secondary Districts Offering Teachers In-Service Training Programs on Various Topics, 1992–93**




Source: 1993 Followup Surveys of Secondary Districts and of Postsecondary Institutions

## FROM STATE POLICY TO LOCAL IMPLEMENTATION

All states have developed performance assessment systems that seek to implement the requirements set forth by the law, and most go well beyond the legislation's minimum requirements. Moreover, most states are applying their systems to all vocational education programs, not just to federally funded

programs. However, a number of issues remain in order to effectively implement state performance measurement systems. This section summarizes these issues.

### Measuring Academic and Occupational Gains

Conceptually, the accountability requirements of Perkins are, for the most part, compatible with state and local efforts to pursue program improvement through more systematic monitoring of outcomes at the student, program, and institutional levels.[17] In general, the legislation provides useful guidelines for the kinds of measures that are appropriate indicators for program evaluation and improvement. The procedures for developing and incorporating them into local evaluation and program planning are flexible and permissive enough to allow states and local education agencies to adapt these requirements to their particular needs and circumstances.

However, some states and local districts have had difficulty adopting the measures specified in the Perkins Act, especially in the area of learning outcomes. For example, it has been especially difficult for states to measure academic gains systematically at the postsecondary level, where there is little comprehensive, uniform assessment of academic achievement. Therefore, many states have chosen to use course completion as a proxy for academic gain.

Similarly, the absence of widely accepted industry skill standards and assessment instruments to measure occupational competencies makes it difficult to assess occupational gains at both the secondary and postsecondary levels. A fair percentage of secondary districts reported using locally developed tests and informal teacher judgment to measure both the academic and the occupational skills of students (see Table 2.3). Perkins Act requirements, however, do provide the impetus for devoting more attention to the problems of measuring academic and occupational skills.

### Evolving Data Systems

Ideally, each state's system of performance measures and standards would be used to assess the effectiveness of vocational programs based on learning and labor market outcomes and would include information on other Perkins priorities, such as the performance of special populations and students in school-to-work transition programs. Currently, many states are developing the capacity to disaggregate performance data on specific groups in their data systems. However, because reporting data on learning outcomes of vocational programs has only recently become a priority, especially at the local level, this effort will take time. Additionally, the original Perkins Act (1984) did not require that data be disaggregated by special population groups.[18]

State information management systems are beginning to change in response to Perkins provisions. For example, some states are starting to collect program-level

data for disabled, economically disadvantaged, and limited-English-proficient students. However, changes such as this often involve modifying the data collection procedures of dozens of local vocational education systems.[19] Many states that lack a database with student-level records will be phasing in more centralized procedures over time.[20] Although most state agencies have some capacity for centralized data automation, very few have direct, on-line linkages with local secondary education agencies and postsecondary institutions.

The primary purpose of these accountability systems is state and local program improvement: helping state and local educators respond more effectively to the needs of students and the marketplace.[21] To this end, the systems must be flexible and adapted to state and local circumstances. Consequently, these systems currently are not well suited to provide uniform national data on program performance. Because definitions and methods of collection differ, state and local systems are unlikely to yield information that can be aggregated across states to produce national estimates on how vocational education programs are doing.

Efforts to require greater uniformity in these systems risk undermining their primary purpose. However, where uniformity and comparability do not seriously conflict with state or local objectives, these efforts should be encouraged. Two examples of such positive change are standardizing the definitions used by state secondary and postsecondary agencies (of program completers and vocational program areas, for example), and developing integrated information management systems. Integrated data systems allow records to be transferred or compared between secondary and postsecondary vocational institutions as well as between vocational and academic programs.

**From State Plans to Local Implementation**

Because of the time required for states to develop performance standards, local implementation has just begun. The data presented in this chapter show that local administrators have been more involved in implementing vocational–academic integration and tech-prep programs than in implementing their accountability systems. Some of the attention to integration and tech prep instead of performance standards can be attributed to the gap in time between the development of systems at the state level and implementation at the local level. However, evidence provided in this chapter, as well as other research, suggests that some difficulties have occurred in translating state-developed plans into locally implemented systems.

First, little or no attention has been paid to how local education agencies should use measures and standards to evaluate and improve local programs. The Perkins Act and associated regulations devoted little consideration to the issue of state-to-local implementation.

Second, although most state administrators saw Perkins requirements as an important departure from the previous legislative environment, some tended to regard them as federal encroachment on state and local responsibilities for public education. Thus, they tended to adopt implementation approaches designed to protect local districts from the burden of implementing measures and standards — rather than developing procedures that would more actively involve the districts in designing, modifying, implementing, and using measures and standards.

Third, state and local education agencies are quite unaccustomed to using data to manage program improvement. Traditionally, they simply collected and reported data to another agency of the state or federal government. As a result, inadequate attention was paid to training state and especially local administrators in techniques of using measures and standards for local program improvement.

Finally, states lack resources to provide technical assistance in implementing measures and standards. While the federal government recognized in the legislation that states needed technical assistance to develop accountability plans, it completely overlooked the need for providing such assistance to local districts.

## CONCLUSION

In general, states are doing a good job developing performance standards and measures. All states are using more than the two standards/measures required by the Perkins Act, and most are applying them to all vocational programs, rather than just to federally funded programs. Most have developed or adopted measures of academic skills, retention or completion, and occupational competencies.

The states devoted considerable time and energy to developing their accountability systems in the two years after passage of the Perkins Act (fall 1990-fall 1992). While the states were working on performance standards, localities were devoting more attention to integration and tech prep. By spring 1993, implementation of the new accountability systems at the local level was beginning. Many localities had collected data on student outcomes before the Perkins Act, and these collection efforts provided a foundation on which the Perkins accountability systems could be built.

Between 1992 and 1993 there was a marked increase in the proportion of districts and postsecondary institutions reporting the use of various performance measures. The most widely used were graduation or retention rates. Relatively few districts routinely assess advanced academic skills with standardized tests, although somewhat more assess basic academic skills. Occupational skills are not often systematically assessed, in part because few valid, reliable tests of these

skills are available. Informal teacher judgments and teacher ratings are the most frequently used measures of occupational skills.

Although most of the new state accountability systems include measures of placement in training-related jobs, a substantial minority of localities were not (yet) using such measures in 1993. Training-related placements are a critical measure of the success of traditional occupation-specific vocational education.

While performance standards have been developed, and many or most localities have begun collecting the required information, there has not been enough attention to how states, districts, and postsecondary institutions will actually use the data to improve vocational programs.

These findings lead to a number of recommendations. **First, the new Perkins Act should support the development of industry skill standards and of valid, reliable measures of performance. Industry-based standards should be used to assess the broad, industry-oriented occupational programs recommended in Volume I. Second, the new Act should encourage states and districts to use training-related placements as key measures of the performance of traditional vocational programs. Third, at the postsecondary level, more attention needs to be given to the measurement of academic outcomes. Fourth, educators at the federal, state, and local levels should give more attention to specific ways in which performance standards and measures can be used to identify the strengths and weaknesses of vocational programs, and to make improvements based on this information. State training of local administrators should be a key element in this process. Finally, the federal government should assess the accountability systems themselves to determine how well they are working.**

## ENDNOTES

1 Section 403(b)(7).

2 Hoachlander, E.G., & Levesque, K. (1993), *Improving National Data for Vocational Education: Strengthening a Multiform System*, National Center for Research in Vocational Education.

3 Rahn, M.L., Hoachlander, E.G., & Levesque, K. (1992), *State Systems for Accountability in Vocational Education*, National Center for Research in Vocational Education.

4 Hoachlander, E.G. (1992), "Performance Standards, Evaluations, Planning, Accountability, and Authentic Assessment for the New Vocationalism," unpublished paper.

5 Section 115.

6 Rahn et al. (1992)

7 The 1993 Followup Survey asked states if their system includes the measurement of academic skills and occupational competencies without distinguishing between the measurement of *attainment* or *gain*. Therefore, states could be measuring attainment, gain, or both.

8 Rahn et al. (1992).

9 Hoachlander & Levesque (1993).

10 Rahn et al. (1992).

11 Ibid.

12 Stecher, B.S., & Hanser, L.M. (1993), *Beyond Vocational Education Standards and Measures: Strengthening Local Accountability Systems for Program Improvement*, National Center for Research in Vocational Education.

13 Rahn et al. (1992), and 1993 Followup Survey.

14 U.S. Department of Education (1994), *National Assessment of Vocational Education Interim Report to Congress*.

15 *Interim Report* (1994), p. 299.

16 Appendix Tables A-2.4 through A-2.7 confirm this point.

17 Stecher & Hanser (1993); Hoachlander & Levesque (1993).

18 Hoachlander & Levesque (1993).

19 Ibid.

20 Rahn et al. (1992).

21 Hoachlander & Levesque (1993).

# CHAPTER 3

# INDUSTRIAL SKILL STANDARDS

## INTRODUCTION

Skill standards reform has become an important component of federal policy. The recently approved Goals 2000: Educate America Act establishes a National Skill Standards Board to encourage the creation of a comprehensive system of voluntary industry skill standards and certification. The system would "serve as the cornerstone of the national strategy to enhance workforce skills," affecting the form and content of work-related education by setting the standards that students must meet.

Ongoing efforts to strengthen linkages between industry and education by the Departments of Education and Labor provide further evidence of a strong federal commitment: Grants to 22 private sector business-labor-education technical committees have been used to promote the development of national skill standards and certification for competencies in a number of industries, including electronics, computer-aided drafting, welding, tourism, and retail trade.[1] Related projects to redesign occupational titles and occupational classification systems are being undertaken by the Advisory Panel for the Dictionary of Occupational Titles and the Bureau of Labor Statistics.

The federal government is also supporting the validation of work skills and their measurement. Under contract to the Departments of Education and Labor, the American College Testing Program (ACT) is identifying work behaviors common to many occupations and linked to employee success in high-performance organizations. Begun as an effort to validate the SCANS skills, the National Job Analysis Study aims to build a comprehensive taxonomy of behaviors necessary for worker success. The behaviors will be used to plan the development of content-valid skill assessment instruments.

Similarly, the 1990 Perkins Act requires states to design a system of performance measures and standards. As described in the preceding chapter, states were to develop and implement state-wide accountability systems by September 1992. They were to use these systems to assess programs with respect to gains in basic and advanced academic skills, and in one or more of the following vocational areas: occupational competency attainment, job or work skill attainment, school completion, or placement in a job or further education. While it is too early to assess the effects of the 1990 Perkins Act performance standards on educational outcomes, Chapter 2 showed that all states have incorporated more than the required two standards.

Although the Education/Labor and Perkins initiatives employ similar language, the content and scope of proposed standards differ across the two undertakings. The Education/Labor grant recipients focus on identifying national industry skill standards and credentials to **assess students' skills and knowledge**, with the intention of using these measures to improve the fit between training and employment.[2] In most of the 22 industry groups, standard development has emphasized job-specific outcomes that require trainees to demonstrate the skills they acquire (e.g., diagnosing a certain kind of problem in an automobile engine). Some industries have taken a more expansive approach, defining standards in terms of broad occupational clusters and general skill needs (e.g., electronics, biotechnology, health). However, lack of a common national framework may complicate future standard development. At present, there is no consensus on the breadth, level, and specificity of the skills to be measured. Indeed, no consistent terminology exists; basic concepts such as "standard," "skill," "industry," and "occupation" mean different things to different industry groups.[3]

The Perkins performance standards are designed to assess secondary and postsecondary vocational education **programs**, rather than students per se. Although states may choose to evaluate occupational competency or work skill attainment among students, performance standards are specifically intended to promote state and local program improvement. Flexibility built into the legislation has given state administrators considerable leeway in interpreting the Act's requirements; although some interstate similarities have been noted in standard development and measurement, currently no two accountability systems are identical.[4] This variability is in keeping with the intent of the measurement system — to permit assessments attuned to the structure and organization of state and local education systems.

While industry skill standards and Perkins performance standards have different assessment objectives, there is some overlap across the two federal initiatives. Two of the five options for performance standards and measures in the Perkins Act permit states to assess programs based on student occupational competency and job or work skill attainment, and there is considerable evidence that this is occurring at both the secondary and postsecondary level.[5] However, since states often lack access to appropriate and reliable occupational standards and assessment instruments, most states have left the selection or development of measurement instruments to localities.[6]

Historically, the development of industry skill standards at the national level has occurred outside of federal vocational policy. This separation may be healthy, since the scope and direction of industry-generated standards are as yet ambiguous, and are likely to undergo further clarification. Unlike the 1990 Perkins objectives, which directly address specific aspects of program improvement, the rationale for industry skill standards is as yet unclear. Industry standards have the potential to serve a variety of purposes: They may be used to

link secondary and postsecondary instruction with marketplace needs, delineate broad or specific job skills required for entry-level employment, or assist employers in retraining and cross-training their existing workforce. While these missions are not mutually exclusive, each approach requires differing organizational and curricular frameworks.

This chapter describes some of the issues associated with developing a comprehensive system of industry skill standards and certification in the United States. It begins by describing a skill taxonomy that may be used to classify different types of standards and credentials with different kinds of objectives. The following section briefly discusses existing domestic and international skill standard systems. The chapter then shifts to the potential benefits and drawbacks of implementing a system of industry skill standards and certification. The conclusion identifies issues that are crucial to the future skill standards debate.

## NEW INITIATIVES TO CREATE STANDARDS SYSTEMS

In a survey of state administrators, the National Governors' Association[7] found strong support among states for the development of a comprehensive national system of skill standards and certification. According to its report, a uniform skill standards system would:

- Be designed for young people entering the workforce for the first time and incumbent workers who need to upgrade their skills to remain competitive.
- Promote flexibility and portability of skills across occupations, industries, and geographic locations.
- Create communication tools among employers, workers, education/training providers, and government that improve the credibility of public services, facilitate information exchange, increase accountability and integrity of public investment, and enhance the efficiency of labor exchange.
- Increase employer investment in training and the development of high-performance work organizations.

These multiple objectives raise a number of questions, however. Can standards for the purpose of school-to-work transition also serve as standards for retraining the existing workforce? Can they also be used for hiring people skilled for jobs that currently exist as well as for high-performance work organizations of the future? Moreover, what degree of occupational specificity is desirable in this system? At present, there is little empirical evidence with which to answer these questions. To focus the discussion, an appropriate starting point is to develop working definitions of terms such as "skill standard" and "credentialing."

**Skill Standards**

The notion of "skill standard" takes on different meanings among different constituencies across and within education, business, and labor. Standards are typically defined as a function of their purpose. For example, a "curriculum standard" in education looks very different, and is used very differently, than a "product-quality standard" in industry. In this chapter, "skill standard" is used to describe the knowledge and skills that an individual must acquire in order to succeed in a particular workplace or job.

A taxonomy that incorporates three "graduated" levels of standards is proposed to facilitate the debate on this issue[8] (see Figure 3.1). The taxonomy is structured around the concept of "mastery," in which individuals move from general to more specific skills and knowledge. It encompasses increasing knowledge, skill, and task complexity , in which each level embraces more specific skill requirements. The "levels" within the taxonomy suggest a sequence of skill and knowledge acquisition, although in fact a good deal of overlap and clustering across levels may exist.

Level 1 standards describe the knowledge that should be mastered by all students before graduating from high school. Students would be required to achieve core academic skills as well as work-related skills, and demonstrate mastery on a performance assessment. This approach could transform the high school diploma from a very general indicator of capability to a valued, portable credential. To achieve this objective, uniform standards should be developed at the national level, along the lines of curriculum standards efforts currently funded by the Department of Education in areas such as civics, math, science, and English.

Level 2 standards are "industry skill standards" or alternatively "occupational cluster standards." One can imagine dividing the entire economy into broad industry sectors such as health, manufacturing, and communications in order to design general standards which may address a large number of occupations. For example, a Level 2 cluster could encompass the health industry, where students would acquire knowledge (such as principles of biology) that would cut across a variety of jobs, including physician, nurse, and x-ray technician. Contextualized education, including subject matter currently classified as academic, would provide a basis for understanding the fundamentals of the health industry. Occupation-specific skills might be taught, but their primary purposes would be to teach underlying principles and enhance cognitive and technical skills that have broad application across the industry. A student who selected a particular area, such as patient care or medical records, would initially study broad industry knowledge before moving toward more specialized Level 3 skills.

Where Level 2 emphasizes contextual knowledge and broadly applicable cognitive and technical skills within an industry, Level 3 emphasizes more

**Figure 3.1**
**Skill Standard Taxonomy**

| Interest | Level | Purpose |
|---|---|---|
| Public | Level 1: Broad-based academic and work-related standards and certification. | Used by secondary schools. All students must attain these standards before graduation from high school. |
| Public and Private | Level 2: Occupational cluster or industry skill standards and certification. | Used by secondary, postsecondary, and other training institutions to assist in school-to-work transition. |
| Private | Level 3: Occupational or job-specific skill standards and certification. | Used by firms or training institutions for imparting job-specific skills. |

specialized technical skills at higher levels of task complexity. For example, the skills and knowledge necessary for effective job performance as an operating-room nurse include that which is required of all workers (Level 1), patient care personnel (Level 2), and registered nurses (Level 3). Likewise, trained auto mechanic would require the skills and knowledge necessary for high school graduation (Level 1), the transportation industry (Level 2), and the occupation of an auto mechanic (Level 3). Although overall skill and knowledge requirements are more rigorous at Level 3, the breadth of skills is narrower, because students concentrate studies within a smaller area.

While skill levels are fairly distinct, they need not be mutually exclusive. Depending upon the industry, the demarcation between Level 2 and Level 3 skills may be somewhat fluid. Substantial overlap may exist across levels and along a continuum of skills, with differences within industries determining not only when a student moves from Level 2 to Level 3, but what constitutes an industry or cluster.

The level of education associated with each standard level would vary across industries and occupations. The certification of a highly qualified auto mechanic would continue to be a two-year postsecondary degree. That of a medical doctor would continue to be medical school, together with internship and related requirements.

The funding and governance of skill standards development require careful consideration. Level 1 standards reflect the public's interest in having a well educated citizenry and the student's interest in having the thinking skills necessary to succeed in work and other aspects of life. Level 2 standards must balance private sector (or employer) interests in specific skill training against the public's interest in assuring that everyone achieves a strong educational foundation. Funding for Level 2 standards, which would be developed via business-education partnerships, should supplement skill training that the marketplace would otherwise fail to provide. For example, while individual automotive companies may have incentives to initiate a system of specific skill standards, automakers as a whole may see little reason to invest in a comprehensive standards system.

Level 3 skill standards are much more job or occupationally specific, and hinge upon industry needs which may vary within and across states. Accordingly, funding for the development of Level 3 standards might best be provided by private sector entities which would devise specific standards to maximize labor productivity. However, Level 1,2, and 3 standards should be developed within a common framework, which can best be provided by the federal government.

**Credentialing**

In much of the legislation and the literature, it is assumed that skill standards must lead to credentialing, although the term is used in a variety of ways. For example, the recent national study conducted by the National Governors' Association[9] found that states define the meaning of credentialing differently, with some referencing individuals' proficiency levels, some the level of education, and still others the amount of specialization demanded within an occupational area.

The Goals 2000: Educate America Act calls for "the development and adoption of a voluntary national system of skill standards and certification." (See Appendix 3-A.) Although "certification" is often used loosely to denote the process of awarding formal recognition for the attainment of specific knowledge or skills through a training program, it often has a more specific meaning when used by state agencies regulating the occupations. Many states define certification as the process by which a person is granted the right to use a title in a given occupation. Licensing is defined as the right to practice a given occupation.

In this chapter "credentialing" is used to denote the process of awarding formal recognition for the attainment of skills and knowledge through an education or training program; it includes certification and licensure (see Figure 3.2).

**Figure 3.2**
**Credentialing**

| General Multi-Skilled Certification | Certification | Licensure |
|---|---|---|
| Assess general industry knowledge across occupations | "Right to title" | "Right to practice" |
| *Assessment examples:* exams; portfolio, performance-based, and multiple assessments | *Assessment examples:* national, state, or industry exam with the required completion of a predetermined amount of work experience, education, and/or job training | *Assessment examples:* national or state exam with the required completion of program at an accredited institution (professional, 4-year, 2-year, or private proprietary) |
| *Examples of initiatives that are working toward a general industry certificate:*<br>• Far West Laboratory (e.g., health)<br>• The New Standards Project (e.g., manufacturing) | *Examples of occupations that require certification:*<br>• Auto mechanic<br>• Interior designer<br>• Landfill operator | *Examples of occupations that require licensure:*<br>• Plumber, journeyman<br>• Cosmetologist<br>• Registered nurse<br>• Insurance agent |

Licensing is the most restrictive form of professional and occupational regulation and is often referred to as right-to-practice. Under licensure laws, it is illegal for a person to practice a profession (e.g., law, medicine, accounting) without first meeting state standards. Under certification, the state grants title protection (right-to-title) to persons meeting predetermined standards (e.g., an interior designer, nutritionist). Those without certification may perform the duties of the occupation, but may not use the title.[10]

A new type of credential is being developed by organizations such as Far West Laboratory and The New Standards Project. This general multi-skilled certificate

will document student's Level 2 skills and knowledge in a broad industrial area through alternative forms of assessment such as portfolios.

In general, industry skill standards that are broad in scope (Level 2) may result in a very different type of certification than more job-specific skill standards (Level 3). Occupational cluster standards may lead to a more general multi-skilled certificate that would be awarded through the use of portfolios and multiple assessment mechanisms, as well as standard examinations. Level 3 certification would reflect facility with job-specific skills and procedures.

The use of tests and other assessment methods relevant to Level 2 certification may face legal challenges. Case law documents the constraints on using tests to screen individuals for employment. Employers must be able to show a direct relationship to the requirements of the job if testing or other forms of assessment are to be used in the hiring process. This tension between a portable credential that equips workers with the skills necessary for a high-performance workplace and one that also satisfies the legal requirements of job-relatedness is far from resolved.

Most of the standards and credentials that currently exist in the United States and other countries are job-specific (Level 3), and lead toward certification or licensure in the traditional sense. A few of the 22 industry skill standards projects are currently breaking new ground by struggling with Level 2 standards in the context of a general multi-skill certificate. For example, the American Electronics Association has developed standards for three clusters that cut across a number of occupations — manufacturing specialist, pre/post sales, and administrative/information services support. Attainment of a certificate will not be used for entrance into a "job," but "an area of work." In practice, however, it is not clear how educational institutions and industries will adapt this certification process to meet employer needs.

## EXISTING SKILL STANDARDS SYSTEMS: U.S. AND FOREIGN MODELS

Identifying and specifying skill requirements is not new in the United States. Over time, a wide assortment of credentialing systems have been developed by federal and state governments, professional associations, private industry, and unions to create and administer occupational skill standards. These diverse efforts do not comprise a coherent national system. Most organizations, in an ad hoc fashion, have developed their own certification standards that emphasize different types of specific (Level 3) knowledge and skills. In contrast, a number of other countries have uniform and well-established processes for specifying skill standards that are consistent in form and national in scope.

**American Skills Standards System**

Credentialing systems in the United States are organized at different levels and serve multiple purposes. At the federal and state level, government regulations are often designed to protect public health, safety, and welfare. For example, the Federal Aviation Administration has developed national standards to ensure that all domestic pilots achieve a minimum level of competency. Similar regulations cover access to other occupations, such as broadcasting, that span state boundaries. State oversight of occupations extends to the provision of health care, as well as other occupations such as cosmetology, insurance, and real estate. There is, however, considerable regulatory variation among states. While nearly all states license barbers, for example, only one, Illinois, licenses breath analyzer operators. Moreover, occupational skill requirements often differ among states; thus, cosmetologists in Alabama face requirements that are different from those in Wyoming.

Professional associations establish standards to increase the credibility and reputation of their profession, and to control the supply of practitioners to the field.[11] In some cases, associations are sufficiently large and powerful to influence national standards. In both medicine and law, for example, all applicants for licensing must be graduates of schools approved by the American Medical Association or the American Bar Association. More often, however, a number of different organizations establish standards and certification procedures. In nursing alone, more than 20 organizations offer certification in a number of specific areas, including neuroscience, rehabilitation, and nephrology.[12] Professional education generally progresses from broad (Level 2) to occupationally specific (Level 3) knowledge and professional skills, with emphasis placed on skill mastery across a wide continuum of theory and practice.

Industry-driven credentialing efforts are typically designed to provide career ladders for employees, and to preempt the need for state regulation. Many associations, such as the American Banking Association, have taken independent action to develop their own certification systems. Many of these frameworks are designed to promote occupational status and regulate quality among practitioners.

Apprenticeships have traditionally been established to meet the needs of employers hiring union members, rather than the needs of the industry as a whole. Here the goal is certification of a minimal level of competency among workers, and a controlled supply of workers entering the industry. Apprentices are provided opportunities to apply theoretical knowledge in a clinical or practicum setting and, as in the professions, mastery of Level 3 knowledge and skills is generally emphasized.

### Foreign Skill Standards Models

National industry skill standard systems are found in a number of Pacific Rim and Western European countries. Analysis of governance structures in seven selected countries[13] has identified two distinct models of system administration: (a) school-to-work transition, in which the creation and approval of standards for students in the process of becoming workers is mediated by the central government, and (b) workforce training, in which private sector agencies establish nationwide standards to retrain or cross-train the existing workforce. Although each model targets a different clientele (i.e., secondary students vs. existing workers) and serves different purposes, there are a number of similarities between the models.

The development of standards in both school-to-work and workforce training models is typically driven by external committees composed of representatives from business, labor, education, and government. Representatives work together to formalize industry standards, which are eventually sanctioned by central government as official skill guidelines. Central government recognition of a uniform skill standard assures that some level of national consistency is ultimately achieved and that credentials are portable. Moreover, since both types of systems rely on qualified industry representatives to identify appropriate standards, identified skills closely match actual industry needs. Finally, government endorsement and dissemination of skill standards, and fiscal assistance to support standard development, assure employers and workers of system integrity.

Whatever their structure, most foreign skill standard systems primarily serve private sector interests. In this context, skill instruction typically emphasizes specific Level 3 skills. While some European countries have used centralized governance models to administer school-to-work and workforce training frameworks, such systems would probably adapt poorly to America's needs. An approach such as that embodied in the Goals 2000: Educate America Act and related federal initiatives is better suited to the country's tradition of decentralized government. In this case, the role of the federal government is to support the development of industry-based standards and measures. States and/or localities can then decide whether they want to use them.

## THE RATIONALE FOR A COMPREHENSIVE SYSTEM OF STANDARDS AND CERTIFICATION

The empirical evidence regarding the usefulness of national systems of industry skill standards and certification is rather modest. The most compelling arguments in favor of skill standards remain theoretical, and point to a number of economic benefits that may accrue to employers, workers, students, and society. This section reviews the existing literature and presents evidence from domestic and foreign models relevant to an American standards framework in

three areas: hiring and job matching, skill acquisition, and the quality of education and training. The discussion describes the potential benefits and drawbacks of adopting skill standards for business and education, and highlights the tradeoffs of using Level 2 and Level 3 skills to drive system development.

### Hiring and Job Matching

The cost of hiring a new worker can be significant. *Training Magazine* estimates that the expense of filling a vacant position is 33 percent of a worker's total first-year annual salary, with much of this expenditure going toward advertising the job opening, screening, transporting and interviewing applicants, and underwriting lost productivity of hiring supervisors. When the costs of orientation, training, and moving up the learning curve are added, total induction costs may approach 93 percent of a worker's starting salary.[14] This being the case, it is to employers' advantage to minimize employee turnover and focus training investments on those individuals most likely to remain with the firm.

Job stability is typically lowest among youth. Using data from the National Longitudinal Study of Youth cohort, Lynch[15] found that 71 percent of males and 66 percent of females changed employers at least once within their first three years after completing schooling. High turnover rates are due, in part, to the fact that young workers often take temporary employment while pursuing further training. Work patterns become somewhat less transient when youth reach their middle to late twenties, presumably because individuals complete training and eventually settle into careers offering some longer term potential.[16] Not all are so fortunate, however. By age 30, over 30 percent of all high school graduates report that they have not held a job for a year, and an additional 12 percent report only a year of tenure in their current position.[17]

One suggested explanation for this flux is that poor job matches (mismatches between the skills workers have and those required by the job) drive workers to continuously seek more promising work. Jovanovic and Moffitt,[18] for instance, estimate that shopping for better job matches may improve workers earnings by as much as 13 percent. Thus, high mobility may be symptomatic of an inefficient job matching system in which employers bear the cost of worker experimentation.[19]

Skill standards could arguably improve work tenure, and thus increase market efficiency, by helping trainees understand occupational skill needs and job requirements. This could reduce firm recruiting and screening costs at the outset, if prospective employees were to self-select based on specified job requirements.[20] Equally important, portable credentials based on skill standards would enable job applicants to accurately communicate or "signal" their skills to prospective employers, thus providing the employers with better information upon which to base hiring decisions. Better job matching could help reduce

turnover, encouraging employers to shift training to younger workers.[21] Thus skills standards could improve overall business productivity by enabling individuals to arrive at work with the background skills and training necessary to make an immediate contribution to the firm.

However, countries that have worked to improve job matching between employers and students have much more than skill standards and certification in place. In many countries, systems include a "transitional" component for students, such as apprenticeships in Germany where students spend time both in the classroom and the workplace. Although there is no guarantee of employment, the employer and student have an opportunity to decide whether they are a good "match" for longer term employment. In Japan, employers view schools as their supplier and cultivate close relations with school personnel. Firms agree to recruit from specific schools (called "contract schools") as long as the candidates put forward by the school meet the firm's requirements.[22] Without other links between the labor market and the formal education system, it is not clear how much developing skill standards will help job matching and decrease turnover.

In addition, many American companies anticipate high turnover in entry-level positions for youth, and structure these jobs to facilitate rapid intake and training. Although hiring and training new employees can be expensive, the cost of engaging entry-level staff, who are often recruited locally and trained on the job, may be significantly less than for more seasoned white-collar professionals. While skill standards may increase labor productivity by reducing hiring costs and increasing job matching, actual savings, though impossible to estimate, would probably be less than the amounts reported in the literature.

Training to Level 2 and Level 3 skill standards could increase private sector efficiency. Which skill level is emphasized would depend upon the intended outcome of training. Level 3 standards would enable employers and youth to make immediate job matches, because both parties would have a clearer understanding of specific occupational skills and requirements. Perhaps for this reason, many foreign countries have adopted training systems that emphasize Level 3 standards.

However, the utility of these skills depends heavily upon finding a training-related job. If the intention of skill standards were to increase long-term employment prospects for individuals, then Level 2 standards would be more appropriate, especially since the labor market is undergoing technological change. Level 2 skills are intended to produce more flexible workers skilled in a number of occupational areas. Although overall skill holdings are less advanced in any one area, workers holding Level 2 certification might be better able to transfer among occupations, and thus might be more easily retrained for changing production strategies.

While Level 3 standards are used in many countries, some rethinking has occurred. In Australia, for example, there is evidence that narrow specifications of job requirements have hindered skill transformation and entrenched existing practice, making it difficult for employees to update skills.[23] There is also some evidence to suggest that many governments are consolidating the number of private industry boards charged with specifying skill standards. As of 1992, Australia had a total of 70 and the United Kingdom 150 separate boards. Plans to reduce active boards are currently being considered, and at least in the U.K., a number of agencies have already been disbanded. Collapsing industry boards in this manner has led to greater clustering of skills into relatively broader occupational areas.

**Skill Acquisition**

Unable to see a clear link between schooling and job requirements, and unable to signal newfound skill holdings to potential employers, many youth have little incentive to seek occupational training.[24] Information asymmetries account, in part, for this lack of incentive. Since most schools are unable to offer the non-college-bound meaningful information on career development and employment opportunities, students often fail to understand the connection between skills and work until after they find employment.[25] This can foster lower productivity and increased turnover among new labor market entrants. A skill standards system that clearly articulated school-based training with industry needs would help students see the link between high school and work, and perhaps motivate them to put greater effort into their studies.[26]

Implementing a skill standards system such as the one outlined in this chapter would be consistent with eliminating the general track in secondary education and replacing it with contextualized academic and work-related education. Unlike students in the college prep or vocational tracks, which offer more targeted studies, students in the general track often graduate without mastering any comprehensive body of knowledge or skills.[27] To build a highly skilled workforce it will be necessary to educate students to higher levels of academic and occupational competencies, and to assure that they demonstrate mastery of academic and work-related standards (Level 1) through examination and other forms of assessment.

In theory, Level 1 examinations would not be used to sort students into college-bound and non-college-bound tracks, but to ensure academic competence among all graduates. However, it is possible that such a system could lead to more rigid tracking than currently exists. For example, the German system sorts students into rigid college-bound and apprenticeship tracks; students in employer-based apprenticeship programs are trained narrowly rather than educated broadly.[28] Unlike the current U.S. system built around "second chances," it is very difficult in Germany for a student to switch tracks and decide to go to college.

A less rigid system would permit all students to choose courses of study which they would pursue through secondary school. Such a system exists in Sweden, which groups 27 lines of study into six divisions: arts and science, the care professions, economics and commerce, technology and science, technology and industry, and agriculture, horticulture, and forestry (Level 2). All of these programs are three years in length, and students who wish to enter the workforce after completion learn more specific skills near the end of their program (Level 3).

In the United States 49 percent of all high school seniors report that they plan to attend a four-year college, while 71 percent plan to go on to some form of postsecondary training.[29] Although not all of these expectations are realized, the high percentage of high school seniors planning to attend postsecondary education must be part of the design of a comprehensive system of standards and certification. Students might not be motivated to increase their skill acquisition if acquiring those skills foreclosed the option of college. Both American parents and students expect postsecondary options to be kept open. In effect, this means that Level 2 contextualized competencies will have to incorporate a good deal of subject matter currently classified as academic, including advanced skills and knowledge in areas such as math and English.

Skills standards would make the skills students acquire more portable, because skill holdings could be defined regardless of where training occurred, and because students would be able to signal potential employers of their increased productivity. This could give workers increased geographic and (to the extent that skills overlapped) occupational mobility. Skill clarification could also reduce employee dislocation and ease labor force reentry of skilled workers, because workers would be better able to document their skill holdings to employers. Skill documentation may be particularly relevant given recent corporate restructuring. If workers change jobs more frequently, then a skills certificate may ease mobility in a more fluid labor market characterized by less job security.[30] At the same time, standards could increase employment tenure by providing career ladders within firms, with mastery of increasingly complex skills tied to internal promotion and remuneration.

While skill standards may provide students with an incentive to pursue training, it is not obvious that students will always benefit from their advanced skill holdings. Though certification may help students show their skill holdings to potential employers, signaling models also have the potential to lock students into particular types of work — or out of work in the event of dramatic workplace change. Moreover, there is no guarantee that certified skills will be recognized throughout the country. Credentialing agreements in the United States currently prohibit many certified individuals from practicing their profession across state lines. For example, an architect certified in Florida may not practice in California without first undergoing recertification, and similar restrictions govern a host of other occupations.[31] Adoption by states of standards

developed at the national level would reduce this problem, as would greater reciprocity among states.

Theoretically, it should not matter whether students are trained and certified using Level 2 or Level 3 skill standards, so long as individuals can signal their knowledge and skill holdings to prospective employers. High-performance organizations in evolving industries may prefer workers trained in Level 2, while firms with constant production requirements and subject to slow technological change may prefer workers with specific Level 3 preparation. Training and certification would have to be responsive to the labor market. Too much emphasis on Level 2 skills might outstrip the demand for high-performance workers and broadly applicable skills, and too much on Level 3 skills could introduce unnecessary rigidities into the market. For example, in the health industry, nurses are not licensed to perform any tasks related to radiology, respiratory health, or physical therapy. Therefore, a patient may need to see several technical specialists instead of one well-trained, multi-skilled nurse. Divisions between jobs in industries such as health care have possibly become too rigid, which argues for broad Level 2 skills to educate workers in these professions for various types of work which they may encounter.

**The Quality of Education and Training**

Clearly articulated industry skill standards could increase the overall efficiency of educational training and assessment. Although training is supposed to reflect labor market conditions, current educational programs often function in isolation from the actual workplace. Introducing externally generated standards could increase the relationship between training and work, and thus increase the relevance of skills with which students graduate. Moreover, monitoring students by using performance assessments tied to standards could help educators keep pace with industry needs. In other words, if students are required to demonstrate skill mastery, employers will be needed to help design performance assessments such that skills directly relevant to the workplace are tested. The standards and assessments would then drive curriculum development.

In theory, skill standards and certification would enable educators to assess student and program performance based upon actual outcomes. The higher the number of students who successfully passed certification exams, the better the program. The higher the number of students placed in jobs after completing a program, the better the program. Institutions and programs would have to demonstrate their performance to students, parents, employers and the community, and students would be able to select programs based on performance. Employers would be able to select students based on successful completion of a credential as well as the performance of the institution the student attended.

This would, in turn, provide greater accountability for program outcomes, which would add an element of competition currently missing among most secondary and postsecondary training programs. Programs offering low-quality instruction would be forced to monitor instructional content more closely, and pay closer attention to student needs, to avoid losing their "market share."

Data on the performance and earnings of program completers would also permit youth to identify high-growth industries and occupational areas prior to enrolling. These statistics would enable students to identify occupations offering the highest probability of economic return, as well as assure the market of an adequate supply of new workers.[32]

In practice, it is not so simple. Implementing industry skill standards and certification systems in and of themselves does not necessarily improve the quality of training and education without serious attention to building accountability systems. As discussed in the preceding chapter, states are currently struggling with implementing such systems, which typically include measuring occupational competency. Although the development of skill standards and assessment mechanisms would assist in this process, other issues also deserving attention include the procedures and costs of collecting and aggregating assessment data, setting appropriate levels for accountability standards, and ensuring equity within the accountability system.

Increased competition fostered among programs by standards could also have some undesirable consequences. If training programs are held accountable for student outcomes, then program administrators may be motivated to accept only the most promising students. This phenomenon, known as "creaming," has been strongly associated with the experiences of the Job Training Partnership Act of 1982 (JTPA).[33] Because JTPA administrators were evaluated on post-training employment and earnings of program participants, they would routinely "cream" from the pool of eligible recipients, selecting only those applicants with the highest potential for success. More creaming was observed in areas with high unemployment and with state pressures to exceed standards rather than attain them.[34] Accountability for public secondary schools would be less of a problem, because most schools cannot select their students. Compositional differences among schools, in terms of student background and ability levels, could be adjusted for by focusing on gains in competencies, rather than levels at one point in time. However, programs within schools might respond to accountability requirements by selecting only the best students.

The type of standard used to monitor outcomes may also have consequences for labor productivity. Level 2 standards, which encompass larger industrial areas and occupations, may be difficult to administer and assess. In addition, since Level 2 skill outcomes may have greater long-run returns, appraising training quality may be complicated. For example, it would be difficult to quantify the degree to which Level 2 skills reduce the likelihood of job termination or increase

future earnings. Although Level 2 standards may be difficult to measure, these skills could increase workforce quality if the evolution toward high-performance workplaces continues. Level 2 standards which emphasize workplace flexibility and broad skills could facilitate retraining, and thus reduce the cost of retooling production.

Conversely, if the labor market undergoes little change, then Level 3 skills may provide higher quality training. Students trained in narrow specializations would possess greater skill holdings upon graduation, and hence be more productive upon hiring. Level 3 skills are also more tangible and easily demonstrated, permitting more accurate skill assessment. While Level 3 skills could prepare secondary students in some fields for higher earnings immediately upon graduation, these rewards may be confined to entry-level positions which offer little opportunity for advancement and have flatter earnings profiles.

## CONCLUSION

This chapter described issues associated with developing a comprehensive skill standards and certification system. A taxonomy categorized standards in three "graduated" levels which support a spectrum of knowledge and skill acquisition. Level 1 designates the academic and work-related skills that all students must have to graduate from high school. Industry-level or occupational cluster skills (Level 2), where students learn knowledge and skills that cut across a variety of jobs within an industry, are notably absent from existing U.S. and foreign efforts. Instead, current credentialing systems emphasize occupationally specific skills (Level 3), which assess specialized skills within particular job areas.

Although the most compelling arguments in favor of skill standards remain theoretical, the literature suggests that developing a comprehensive system of standards and credentialing may provide a number of benefits for employers, workers, students, and society. It is clear from this discussion, however, that different skill standards will promote different skill outcomes. Accordingly, insofar as the skill standards are designed to:

- Improve job matching, then Level 3 standards may be most appropriate, because they enable both employers and youth to have a clearer understanding of specific occupational skills and requirements. However, job matches may be a relatively short-term benefit, because workers are trained for a specific occupation and are less able to adapt to workplace change.

- Improve long-term employment options and capabilities associated with demands of high-performance work environments, then Level 2 standards may be most appropriate, because they produce multi-skilled workers who may more easily transfer among occupations, and thus be more easily retrained for changing production requirements.

> However, securing initial job matches may be difficult, because workers are less knowledgeable about particular skill needs.

Skill standards and certification may improve labor productivity by providing incentives for students to seek skill acquisition. Assuming adoption of national standards by some states and some reciprocity across states, both Level 2 and Level 3 skill standards could enable students to better signal their knowledge and skill holdings to prospective employers while increasing skill portability.

Furthermore, standards and their associated credentialing systems could increase the overall efficiency of educational training and assessment, because externally generated standards could tighten the relationship between training and work, thus increasing the relevance of skills with which students graduate.

Relying on supply and demand to mediate skill standard development will not address larger human capital and societal concerns. In the absence of public action, skill standards systems will probably continue to originate in the private sector and to be developed in an ad hoc manner. Thus, it would be appropriate to have the public finance at least some portion of system development. Definition of standards can be created through a mutual business-education partnership which would serve components of each system, that is, providing education as well as training.

Although better information is needed on the economic and other effects of industry skills standards, on balance we think that the federal government should press ahead with their development.

*Future Directions*

**Future standard-setting and credentialing initiatives should coordinate current Level 3 job-specific standards and develop new Level 2 standards based on industries or occupational clusters. The nation currently has a patchwork of Level 3 standards for occupations ranging from auto mechanic to nursing assistant to dog groomer. However, many occupations are missing from this tableau. A first step toward developing a national standards system might be to coordinate, integrate, and elaborate existing Level 3 standards.**

**Equally important is the development of Level 2 industry or occupational cluster standards, which are currently lacking. The 1990 Perkins Act has attempted to move vocational education from job-specific instruction to more broadly based industry training incorporating academic and vocational subjects. Congress can further this objective, through the next Perkins Act or other legislative action, by supporting the development of Level 2 standards.**

**At the same time, further assessment of credentialing systems is needed. The fact that some states certify given occupations while others do not might provide one avenue of comparative research.**

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# PART II

# THE SCHOOL-TO-WORK TRANSITION

# CHAPTER 4

# INTEGRATION OF ACADEMIC AND VOCATIONAL CURRICULA

## THE ROOTS OF ACADEMIC/VOCATIONAL INTEGRATION

### The Public Policy Issue

Academic and vocational education have been on separate tracks since the beginning of public vocational education in this country. Through the late 19th century, public secondary education had traditionally been academic, designed to prepare small numbers of students for college or clerical work. In 1890, according to one estimate, only 3.5 percent of 17-year-olds graduated from high school.[1]

By the early 20th century, a growing coalition of businesses, education reformers, and others persuaded public school systems to link education more directly to work. In some cities, the movement led to the creation of business and commerce courses in regular high schools. But the movement's larger effect, in line with its main purpose, was the creation of separate all-day trade schools, continuation schools for youth in the labor force, and vocational evening schools. By 1910, 29 states were providing some form of vocational education in agriculture, trade and industry, home economics, and manual training.[2]

Leaders of the vocational education movement, such as Charles Prosser, executive director of the National Society for the Promotion of Industrial Education, and David Snedden, Massachusetts' education commissioner, emphasized the need to prepare youth for entry-level jobs by providing specific occupational skills in separate vocational schools.

In turn, critics of this brand of vocationalism, such as John Dewey, argued that such specific skill training was unnecessarily narrow and that a dual school system would create invidious distinctions among youth and undermine democracy. Dewey believed that occupational studies should be part of a broader and richer curriculum in secondary education.[3] Thus, by the second decade of the century, the debate over the curricular and physical separation of vocational education from regular education had been framed.

The Smith-Hughes Act of 1917 emphatically reflected the views of Prosser, Snedden, and their allies. It helped fund separate vocational schools, particularly the continuation schools. It supported agricultural education, trade and industrial education, and home economics, but denied funding to occupational courses, such as business and commerce, in comprehensive high schools. It called for specific skill training and focused on entry-level jobs.

The legislation set up the Federal Vocational Education Board (the first and only federal school board) to oversee the administration of the Act.[4] It also supported, or prompted the creation of, separate state boards and administrations devoted to vocational education. As is true today, states had to generate and submit plans for the use of federal vocational education funds.

The Smith-Hughes Act contributed substantially to the separation of academic and vocational education, and its legislative successors continued in this tradition into the 1980s. Although the newer laws were different from Smith-Hughes in many ways, they continued to assume that vocational and academic education would remain separate endeavors in administrative, curricular, and often physical terms. The 1963 Vocational Education Act, for example, redefined vocational education to include occupational programs, such as business education, in comprehensive high schools. It also subsidized the construction of the half-day area vocational schools that today provide most of the vocational education that occurs in separate facilities.

In the mid-1980s, however, education reformers concerned about the status and role of vocational education began to call for a reversal of the traditional pattern. Vocational enrollments were declining, and many critics charged that vocational education was, in effect, a separate and unequal form of public schooling. The 1983 report of the National Commission on Excellence in Education, *A Nation at Risk*,[5] largely ignored vocational education. Many felt that the nature and quality of vocational education were part of the problem of the nation's declining international competitiveness.

In 1984, a year after the Excellence Commission's report, the National Commission on Secondary Vocational Education published *The Unfinished Agenda: The Role of Vocational Education in the High Schools*.[6] The report called for integrating academic and vocational education and provided a major impetus for reforming vocational education. Other reports in the middle and late 1980s stressed the need for schools to place more emphasis on basic academics and on training students to think well and clearly.[7]

The 1989 National Assessment of Vocational Education strongly recommended integrating academic and vocational education. The Assessment found that men with no education beyond high school use only about 33 percent of all their occupationally specific courses in their jobs, and women use about 46 percent. Much of the problem is due to the fact that participants in secondary vocational education usually do not get jobs in the fields for which they were trained.

The Assessment noted that "these rates are low enough to call into question the efficacy of highly specific forms of occupational training for many students at the secondary level. It may be possible to restructure secondary vocational education, however, so that it serves students with different work and

educational goals more effectively."[8] The report went on to recommend a curriculum alternative that would provide "broad occupational training and integrated academic and vocational instruction." The 1990 Perkins Act reflects this emphasis.

## The Changing Workplace

The changing organization of work has also been important in the development of vocational education and in the current movement toward integration. The rise of vocationalism around the turn of the century reflected a shift in the economy from craftsmanship to industrial organization.[9] Henry Ford pioneered, and Frederick Taylor rationalized, a system of industrial production that relied on subdividing labor and mechanizing production. Industries needed workers who could function as parts of a machine, using narrowly defined specific skills in endless repetition. Workers were not expected to think; that was management's role.

As noted in the Introduction to Volume II, the Ford/Taylor model of industrial production was effective and competitive into the 1960s. By the 1980s, however, competitive pressures, both international and domestic, were prompting American business to adopt components of the high-performance workplace, which stresses the need for flexible, adaptable workers, able to shift jobs, work in teams, and use their thinking skills to solve problems and make decisions.[10]

Many of these changes in the workplace have contributed to the movement to integrate academic and vocational education. Integration seeks to improve the intellectual development of students by using applied learning, consistent with the need to think clearly at work, master a variety of complex tasks, rotate jobs, and perform quality control. Integration changes the focus of education from specific vocational skills to broader and more generally applicable academic and occupational skills, consistent with the breadth, flexibility, and qualities of mind needed in the high-performance workplace. Integration is also compatible with a team approach to learning in an applied context.

## The Theoretical Context

Another contributor to the movement for integrated academic/vocational education is the research on contextualized education initiated by Resnik at the University of Pittsburgh. Resnik[11] argues that students learn better when a subject is placed in a context that is meaningful to them and related to the world outside of school than when it is taught in the abstract, dissociated, and rote manner that she believes characterizes most teaching in American classrooms.

Proponents of integrating academic and vocational education have adopted contextualized education as one of the theoretical bases of the movement. For example, Adelman[12] observes that vocational education courses could provide

an ideal context for learning academic concepts in work-relevant situations. A review of the literature on contextualized learning that describes and assesses this kind of education is discussed later in this chapter.

In light of the changes in workplace organization and the plethora of recommendations for reform generated in the middle and late 1980s, the 1990 Perkins Act places heavy emphasis on integrating academic and vocational curricula. Specifically, the Act requires that Title II, Part C funds, which provide the bulk of assistance to local districts and institutions, be used to "provide vocational education in programs that . . . integrate academic and vocational education . . . through coherent sequences of courses so that students achieve both academic and occupational competencies."[13]

## THE STRUCTURE OF INTEGRATION

What does the integration of academic and vocational curricula entail? Grubb has found that schools bring academic and vocational education together in a number of different ways, which comprise eight different models of integration at the secondary level. Stasz et al.[14] have summarized these models as follows:

1. **More academic content is incorporated in vocational courses** taught by vocational teachers to vocational students.

2. **Academic and vocational teachers cooperate to incorporate academic content into vocational programs.** Unlike model 1, this approach requires teachers to collaborate in curriculum development.

3. **Academic courses are made more vocationally relevant** by including more vocational content in existing courses or by adopting new courses such as "applied academics."

4. **Curricular "alignment"** is accomplished by modifying or coordinating both academic and vocational curricula across courses or over time.

5. **Senior projects** are done in lieu of elective courses and require students to complete a project that integrates knowledge and skills learned in both academic and vocational courses.

6. **The Academy model** is a school-within-a-school that aligns courses with each other and to an occupational focus. It is a program for selected students within a high school.

7. **Occupational high schools and magnet schools** align courses with each other and to an occupational focus for all students and programs in the entire school.

8. **Occupational clusters, career paths, and occupational majors** feature a coherent sequence of courses and alignment among courses within clusters. Teachers are often organized by clusters, not traditional departments.

Grubb and Kraskouskas[15] have also identified eight models of integration at the postsecondary level. These models, summarized by Stasz et al.,[16] are listed in Appendix 4-B.

## IMPLEMENTING THE INTEGRATION OF ACADEMIC AND VOCATIONAL EDUCATION

This section uses 1992 Omnibus Survey and 1993 Followup Survey data to examine efforts by states, districts, schools, and postsecondary institutions to integrate their academic and vocational curricula, consistent with the provisions of the Perkins Act. (These surveys are discussed in the Technical Appendix in Volume V.) Prominent among the integration efforts examined are steps related to the models of integration identified by Grubb and his colleagues. Because the Perkins requirement for integration applies only to districts and postsecondary institutions receiving basic grants, we look at grant recipients specifically, as well as at districts and postsecondary institutions in general.

The survey data indicate fairly widespread efforts at all levels to integrate, and more efforts in Perkins-funded districts and postsecondary institutions than in those not receiving funds. However, other survey data and case study information suggest that integration activities are new and small, that they tend to be ad hoc, and that they typically depend on the efforts of a few individuals in an organization.

### Efforts by State Agencies

How active are state agencies in promoting the sort of integrated education envisioned by the Perkins Amendments? Table 4.1 shows the proportions of state secondary and state postsecondary agencies that had taken specific steps to help local institutions integrate their curricula by 1991 and by 1993. Among state secondary agencies, efforts to promote integration are widespread. Most of the agencies were active before Perkins implementation (in 1991), and the proportions taking specific steps to help districts integrate their curricula increased between 1991 and 1993 for most activities. (See Figures A-4.1 and A-4.2.) The purchase of applied academics materials from commercial vendors, in-service training for vocational and academic teachers, and technical assistance

to districts are the most popular efforts to facilitate integration. Virtually all the secondary state agencies (92–98%) had taken these steps by 1993.

As at the secondary level, the purchase of applied academics materials, teacher training (vocational), and technical assistance were the facilitating measures most frequently reported by postsecondary agencies in 1993, with about two-thirds reporting that they had taken these steps.

Although efforts to promote integration are less evident in postsecondary state agencies, integration efforts are increasing faster than at the secondary level. (See Table 4.1 and Figures A-4.3 and A-4.4.) As of 1991, only about one-fourth of state postsecondary agencies, or fewer, reported ever having taken specific steps to help local institutions integrate (with two exceptions). By 1993, between one-third and two-thirds of the agencies had done so, depending on the activity. Still, the proportions of postsecondary agencies taking steps to promote integration were lower than those of secondary agencies in 1993.

The provision of in-service training on integration for vocational teachers is a striking example of the greater increase in activities at the postsecondary level. By 1991, 61 percent of secondary agencies had provided training of this type; by 1993, almost all of them (96%) had done so. The relative increase in the proportion of secondary agencies facilitating integration in this way was 57 percent. At the postsecondary level, only 22 percent of the agencies had provided training on integration to occupational faculty by 1991. By 1993, 66 percent had done so, a relative increase of 200 percent.

The patterns of change between 1991 and 1993 are more complex than this example suggests. Postsecondary teacher training and technical assistance were the most vigorous areas of expansion in this period. Readers interested in more detail on this subject should see Figures A-4.1 through A-4.4 in the Appendix.

Grubb and Stasz find that levels of Perkins funding are associated with increased integration activity among postsecondary state agencies but not among secondary agencies.[17] It may be that secondary agencies were already familiar with the concept of integration and had undertaken some activities to promote it before passage of the Perkins Act, whereas some postsecondary agencies only became actively involved in integration after Perkins brought it to their attention. If so, postsecondary agencies may promote greater integration efforts in local postsecondary institutions in the future.

Although integration activities are widespread among state secondary agencies, and becoming more so among state postsecondary agencies, the fact that many agencies are making specific efforts to facilitate integration is not the same as saying that states are devoting a lot of resources to these efforts. In a given area of activity, most states are doing something, but how much are they doing?

**Table 4.1**
**Percent of State Secondary and Postsecondary Agencies Taking Specific Steps to Promote Academic and Vocational Integration, 1991 and 1993**

| Steps Toward Integration | Secondary | | Postsecondary | |
|---|---|---|---|---|
| | 1991 | 1993 | 1991 | 1993 |
| Help make available applied academic or other integrated course materials from commercial vendors (e.g., CORD or AIT) | 86 | 98 | 54 | 68 |
| Provide in-service training for vocational teachers on integration | 61 | 96 | 22 | 66 |
| Provide in-service training for academic teachers on integration | 54 | 92 | 9 | 52 |
| Provide technical assistance for administrators on integration | 69 | 92 | 28 | 62 |
| Fund pilot projects that integrate academic and vocational education | 71 | 80 | 29 | 50 |
| Provide recommended curriculum frameworks or guidelines for academic/vocational integration | 52 | 82 | 22 | 52 |
| Provide guidelines on development of coherent sequences of courses | 40 | 73 | 26 | 54 |
| Promote participation in a regional curriculum, such as SREB, that supports integration | 49 | 53 | 40 | 68 |
| Develop or disseminate state-developed integrated curricula | 44 | 57 | 22 | 34 |
| Adopt a definition of integration | 27 | 49 | 15 | 38 |
| Combine vocational curriculum frameworks with those of academic departments at state level | 26 | 51 | 16 | 44 |
| Provide mandatory curriculum frameworks or guidelines for academic/vocational integration | 20 | 8 | 19 | 22 |

Sources: Omnibus and Followup Surveys of Secondary and Postsecondary State Agencies

One available measure is the number of secondary teachers who had received state-provided training in integration by 1992. Based on reports from secondary agencies, a mean 764 vocational teachers per state had received state training in integration by this time. Altogether, the mean number of vocational teachers per state was 2,920.[18] Thus, about one out of four vocational teachers had received training in integration from their states by 1992. On the academic side, a mean 527 academic teachers per state had gotten such training, out of a mean 14,280 teachers. Although this is a small proportion of all academic teachers (4%), the number trained is about two-thirds the number of vocational teachers receiving training.

These data reflect a fairly substantial effort by states to facilitate integration in this way. Further, the fact that more states had provided training by 1993 than by 1992 means that the number and proportion of teachers having received state training in integration is now somewhat larger than the above estimates suggest.

**District Efforts to Integrate**

***Federal and State Support for District Integration Efforts***

In Chapter 1 we saw that federal and state support for integration are important factors in the number of steps districts take to integrate their curricula. In the preceding section of this chapter we saw that state secondary agencies have initiated many activities to promote integration. How do district administrators assess the support they receive from the Perkins Act and from their states? How many districts are affected by federal and state initiatives promoting integration? Data from the Omnibus Survey address these questions.

Approximately 84 percent of the local districts surveyed reported having taken at least some steps to integrate academic and vocational curricula by 1991–92. Of those, about one-third said the Perkins Act was largely instrumental in motivating their efforts to integrate. Other national reform efforts, such as the report of the (Labor) Secretary's Commission on Achieving Necessary Skills (SCANS); *America's Choice: High Skills or Low Wages; America 2000*; and the National Education Goals reports were cited less often as reasons for integrating.[19]

Although the perceived impact of the Perkins Act on integration efforts in all districts was not dramatic, it was much more marked in districts funded with Perkins money. Funded districts were more than three times as likely as others to credit Perkins with motivating their integration efforts.

Consistent with this view, there are substantial differences in integration efforts between districts that received Perkins Title II funds in 1991–92 and those that did not. In every category of activity, funded districts, both regular and vocational, were more likely than unfunded districts to report taking steps to integrate their curricula. (See Appendix Table A-4.1.)

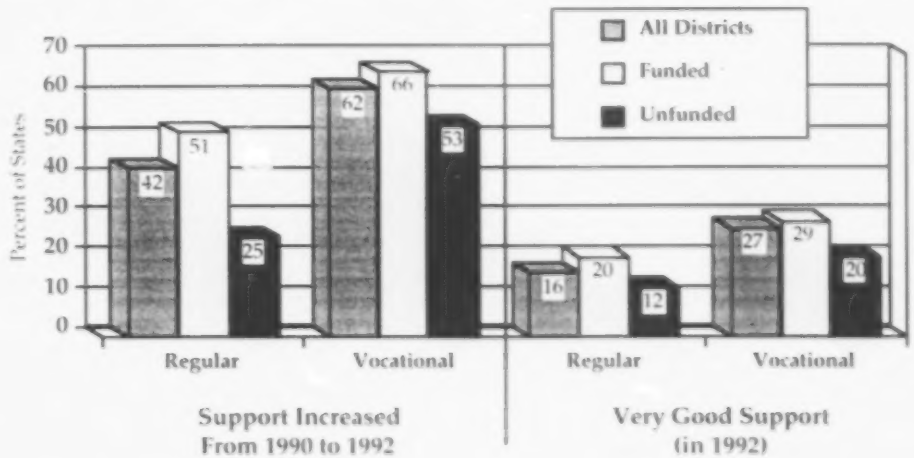
Some of the case studies provide examples of the stimulative effects of Perkins funds. In one Pacific Coast city, researchers found that

> with the infusion of Carl Perkins funds and restructuring ideas, vocational and academic teachers at many schools were beginning to talk to each other. . . In the newer vocational classes, such as the introductory technology course, academic materials were being integrated into vocational coursework.

However, "vocational faculty believed that more integration was taking place than did their academic colleagues."

In districts' view, state support for integration was rather modest in the first year of Perkins implementation, but picked up substantially in the second. In 1991–92 about half of the districts in the survey said that state support was "adequate," but only about one-fifth said it was "very good." Vocational districts and Perkins-funded districts were more likely than regular districts and unfunded districts to say they received "very good" support (see Figure 4.1). Fewer than half (45 %) of the districts (regular and vocational combined) said that state support for integration had increased from the previous year, when integration was not a priority. However, in the 1993 Followup Survey, a much larger proportion of districts (74%) said that state support for integration had increased since 1990.

**Figure 4.1**
**Regular and Vocational Districts Reporting on State Support for Integration, by Funding Status**




Source: Omnibus Surveys of Regular and Vocational Districts

### *Local Implementation Efforts*

How extensive are local efforts to integrate vocational and academic curricula? The Omnibus Survey and the 1993 Followup Survey asked district administrators to report on ten specific steps to integrate the two streams of education. The percentages of regular and vocational districts that had taken each step by 1990–91 and between 1990 and 1993 are shown in Table 4.2.

The steps most frequently taken between 1990 and 1993 were (a) integrating curricula across academic and vocational courses; (b) developing guidance and counseling activities for integration; (c) providing in-service training for vocational and academic teachers; and (d) developing sequences of integrated academic and vocational courses. At least three-fifths of regular districts and three-fourths of vocational districts were engaged in such efforts between 1990 and 1993. In every category, higher proportions of vocational than regular districts reported efforts to integrate.

All integration efforts except the development of magnet schools experienced growth across districts in this period. The greatest growth was evident in the four activities listed above — cross-curricular integration, guidance and counseling, teacher training, and the development of course sequences. Across school districts as well as state agencies, teacher training especially experienced vigorous growth in the first years of Perkins implementation. Some of the integration-related measures in Table 4.2 (e.g., the provision of release time to teachers) are discussed later in this chapter.

### The Use of Applied Academics

The use of applied academic materials from commercial vendors, such as the Center of Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT), is widespread in secondary education. Between 1990 and 1993, 29 percent of regular districts and 55 percent of vocational districts purchased "Principles of Technology," the CORD/AIT applied physics program. Further, 62 percent of regular districts and 83 percent of vocational districts purchased other applied academic materials; and as we saw earlier, almost all states are helping with the purchase of these materials.

Reported use of applied academic materials in secondary schools was lower in 1991–92 (35% of regular schools, 52% of vocational schools), suggesting that 1992–93 saw a substantial increase in purchases, and perhaps that some materials bought by districts were not yet being used in schools at the time of the survey. In any case, the use of applied academics is an important, though not necessarily dominant, part of the integration process in secondary education.

**Table 4.2**
**Percent of Regular and Vocational Districts Taking Specific Steps to Integrate Academic and Vocational Education, by 1990–91 and Between 1990 and 1993**

| Steps Toward Integration | Regular | | Vocational | |
|---|---|---|---|---|
| | By 1990–91 | Between 1990 & 1993 | By 1990–91 | Between 1990 & 1993 |
| Integrate curricula across academic and vocational courses | 42 | 77 | 58 | 85 |
| Develop guidance and counseling activities to promote integration | 41 | 72 | 50 | 77 |
| Provide in-service training for vocational teachers on integration | 32 | 68 | 48 | 90 |
| Develop sequences of integrated academic and vocational courses | 36 | 64 | 50 | 78 |
| Provide in-service training for academic teachers on integration | 21 | 58 | 37 | 78 |
| Provide release time for teachers to develop integrated courses | — | 47 | — | 67 |
| Develop occupational clusters, career paths, or occupational majors | 26 | 46 | 53 | 71 |
| Evaluate vocational teachers on instruction in mathematics, reading, and/or writing | 16 | 29 | 32 | 43 |
| Develop academies or occupationally oriented schools within schools | 9 | 19 | 15 | 31 |
| Develop occupationally oriented magnet high schools | 5 | 5 | 17 | 14 |
| Purchase CORD-produced Principles of Technology | — | 29 | — | 55 |
| Purchase other integrated or applied academic curriculum materials | — | 62 | — | 83 |

Sources: Omnibus Surveys of Regular and Vocational Districts, 1993 Followup Survey of Districts

### Acceptance of Applied Academic Credits by Universities

In the past, state universities generally have not recognized applied academic courses as satisfying admissions requirements. Lack of recognition for these courses may discourage the enrollment of secondary students who want to go to college, either upon graduation from high school or later on. This disincentive, in turn, could increase the difficulty of integrating vocational and academic curricula. From the perspective of the universities, the central issue is the academic rigor of applied academic courses. Vocational educators are more likely to see the issue as one of bias toward traditional academics as the appropriate preparation for college.

The situation is changing, however. State universities are beginning to recognize some of the better known applied curriculum packages, especially those from CORD and AIT. In a study for the National Assessment, McCormick[20] identified 29 states that accept applied academic courses for credit toward university admission under various circumstances. Principles of Technology (PT) is the most widely accepted course; of the 29 states, 26 indicated some form of recognition for this course. In some states, PT credits are accepted only if the course is taught by a science teacher or only if a second science course has also been completed. Applied Mathematics is accepted in 19 of the 29 states. Some states permit substitution of Applied Math 1 and 2 for Algebra I; others recognize the credits only for students who subsequently complete Algebra 2.

Systematic data on the recognition of other applied courses, such as CORD's Applied Communications and the newer Applied Biology/Chemistry, are lacking. A few states are known to accept credits for these courses; acceptance is generally conditioned on other factors, such as the course's being taught by an academic teacher or being accompanied by other courses or enhancements.

### Scope of Integration Within Districts

The state and local survey data indicate that some integration-related activities are widespread **across** districts and schools, but we must ask how much change is taking place **within** them. Based on 1992 data from the Omnibus Survey, the *Interim Report* observed that districts seemed to be taking an adaptive approach to integration, making small changes to accommodate it in the existing structure, rather than undertaking the kind of systemic reform envisioned by the Perkins Act.[21] The 1993 Omnibus Followup Survey and data from the National Education Longitudinal Study's (NELS) 1992 Followup Survey showed signs of somewhat greater depth of integration efforts.

First, although a majority of schools said they had established procedures for collaboration between academic and vocational teachers by 1992, relatively few had made increased time available to teachers to work on integration. By 1993, substantially more had done so. Although we do not have Followup Survey data

on schools, we can gauge the extent of change by comparing 1993 data from single-school districts with 1992 data from schools in such districts. In 1992, only 16 percent of these schools said that they had made increased time available to teachers for integration, and 18 percent said that they provided common planning periods for teachers to work on integration. In the Followup Survey, 45 percent of single-school districts said that they had provided release time for teachers to work on integrated courses.

Second, the *Interim Report* noted that as of 1992, more secondary schools were incorporating employability or generic workforce skills into vocational curricula (a conservative approach to integration) than were integrating across academic and vocational curricula (an approach requiring more curricular change).[22] However, the report also noted that the largest **increases** in school-related integration activities were occurring in efforts to integrate across the curricula, rather than in those supplementing vocational courses. The 1993 Followup Survey data confirm that cross-curricular integration efforts are spreading rapidly. By 1992, 50 percent of schools in single-school districts said they had taken steps to integrate across academic and vocational curricula. By 1993, 77 percent of the single-school districts said they had done so.

Third, the National Assessment of Vocational Education Teacher Survey found that in 1992–93 only small percentages of vocational teachers (11% or less) spend more than 10 percent of class time on a given academic subject. However, a majority of vocational teachers spend at least this much time on **some** academic subject. Moreover, recent analysis of the 1992 NELS shows that applied learning is a fairly prominent feature of secondary vocational education. As Chapter 4 in Volume II found, 43–46 percent of vocational concentrators[23] and half to two-thirds of vocational specialists[24] reported that their vocational classes placed "major emphasis" on helping students understand how scientific ideas and mathematics are used in work; thinking about what a problem means and the ways it might be solved; and helping students understand mathematical and scientific ideas through the use of tools, machines, lab equipment, etc.

Much lower proportions of college-prep and general track students (13–30%) report such emphasis in the vocational courses they take. Differing perceptions of similar courses may account for some of these differences, but a more plausible explanation is that vocational concentrators and particularly specialists are reporting on more advanced vocational courses. If so, the more advanced courses would seem to include a substantial emphasis on applied learning or applied academics. This leads to the hypothesis that vocational teachers would report more academic content in their advanced vocational classes.

Still, these improvements in the development of integration should be viewed in light of findings from the National Assessment's Teacher Survey, conducted in 1992–93. As the *Interim Report* noted, vocational teachers in that survey said they had little interaction with academic teachers, and vice versa.[25] Teachers on each

side of the academic/vocational divide were much more likely to collaborate with one another than with teachers on the other side of the line.

**Barriers to Integration**

Despite progress in efforts to integrate academic and vocational education, the obstacles to integration are still substantial. Stasz et al.[26] have reviewed the literature on these barriers, and we will not discuss them all here. However, the data from Community Case Study sites visited between November 1992 and March 1993 make some of these difficulties strikingly clear.

The fact that vocational and academic education have historically developed along separate lines pervades their interaction today.[27] More often than not, the two forms of education are separated physically, pedagogically, and in a number of other ways. Indeed, they have been described as different cultures within secondary education.[28]

Their physical separation — in separate wings or levels of the same school, in separate buildings on the same campus, or in separate buildings in different locations — poses obvious problems for integration. In area vocational schools, the transportation and scheduling of students, often difficult enough without integration, can become more difficult when specific sequences of academic and vocational courses must be accommodated. Physical separation also makes collaboration between academic and vocational teachers harder to accomplish.

Pedagogical separation is even more problematic. Case study data show that ingrained divisions between academic and vocational teachers, and their indifference or resistance to changing what and how they teach, are major obstacles. For example, in a high school in one western community, "several teachers and administrators indicated that 'territoriality' based on discipline affiliation . . . impedes integration efforts." Teachers at a comprehensive high school in the South described a "wall" between academic and vocational faculty. At a western high school, researchers noted that "no real interaction with academic teachers occurs," although at a Pacific Coast school, as noted earlier, vocational and academic teachers "were beginning to talk to each other," with the infusion of Perkins funds.

The distance between academic and vocational teachers is illustrated by the following description of a meeting in one vocational high school:

> In the teachers' interview, which included nearly all the vocational and academic teachers, [they] segregated themselves into two groups according to their vocational or academic status. . . . When the topic of integration was broached, they first laughed, then attempted to describe some examples of it, then admitted that they work in different parts of the building and rarely get into each others' part.

In general, vocational teachers seem to be more interested in integration than academic teachers are (although many on both sides of the divide prefer to leave things as they are). For example, in an urban midwestern high school, researchers noted:

> The [vocational] teachers pointed out . . . that integration is not the focus of academic teachers: "Academic teachers are not forced to include us [in their discussions], as we are forced to include them."

Relative lack of interest on the academic side is also evident in the Omnibus surveys: Respondents in secondary and postsecondary state agencies are about twice as likely to think that state vocational officials support integration as they are to think that state academic officials do.[29]

Further, although more districts are providing release time to teachers to work on integration, lack of adequate time was still a serious problem when the case studies were conducted in 1992–93. For example, in one northeastern district researchers found the "the biggest impediment [to integration] is lack of time." Lack of planning time seems to result in an ad hoc approach that depends primarily on individual initiative. In a plains-state high school, for example, case-study researchers found that

> academic/vocational integration efforts are obviously sporadic and depend heavily on the inclinations of individual teachers.

In a large midwestern urban center,

> Schools were primarily integrating on an informal and sporadic basis. There was only one school. . . that was actively and formally producing an integrated curriculum. This school was still in the planning stages. . .

In one western city, one of the few integrated courses, trade and technical mathematics, was not being taught because the course instructor was on sabbatical.

Competition between academic and vocational teachers for students can also complicate efforts to integrate the curricula. As the case study summary observes:

> Staff who teach courses classified as electives, which nearly all vocational classes are, must compete for students' time against academic staff who have the weight of ever-increasing numbers of required academic credits on their side. If elective classes do not fill, classes are canceled and staff reassigned or let go.[30]

None of these obstacles to integration is insurmountable, but it will take a great deal of time and concerted effort to overcome them.

### The Quality of Integrated Education

Suppose that secondary integration efforts achieve the depth and coherence that are still lacking, despite recent improvements. Can we assume that the result will be better education? Not necessarily. It depends on the quality of the integrated course offerings.

Some evidence suggests that there may be problems in this respect. For example, studies of integration programs in secondary schools, reviewed by Stasz, "revealed that [they] involved instruction of very basic skills; very few programs stressed higher order thinking skills."[31]

Further, questions must be raised about the quality of integrated curriculum materials being offered commercially. There is some evidence, discussed later in this chapter, that two of the better known applied curriculum packages, Principles of Technology and, to a lesser extent, Applied Mathematics, are effective in improving student test scores. However, almost no solid research has been done on the hundreds of other offerings, and there are many examples of poor-quality materials.

If instruction in integrated courses is not of good quality, students in training for careers would probably be better off in traditional academic classes. Data presented in the 1989 National Assessment of Vocational Education indicate that taking algebra tends to raise the math scores of non-college-bound students approximately ten times as much as taking math-related vocational courses (as they existed at that time).[32]

At present the information on this subject is largely anecdotal, and many examples of strong integrated courses and poor academic courses can certainly be found. The point is that it should not be assumed that integration **per se** will transform vocational education. Integrating unchallenging or irrelevant academic and vocational materials will provide little benefit to students.

### Integration at Postsecondary Institutions

How extensive is the integration of academic and vocational curricula in postsecondary institutions? Integration has not been as much an issue in postsecondary education as at the secondary level, in part because the recent education reform movement has focused on secondary education. As late as 1993, Grubb and Stasz observed that "the idea [of integration] is quite unfamiliar at the postsecondary level."[33]

Although the term "integration" and the issues associated with it are not widely recognized at the postsecondary level, many postsecondary institutions do in fact have components of integrated education. The *Interim Report* found that postsecondary institutions were as likely as secondary districts to have taken at least some steps to integrate their curricula. By 1991–92, 86 percent of the postsecondary institutions and 84 percent of the districts said they had done so.[34]

The report also found that prior to implementation of the Perkins Act, postsecondary institutions already showed some areas of strength in curricular integration. By 1990–91, almost three-fourths of the institutions had established general educational competencies for occupational students, which are often linked to occupational courses by prerequisites or corequisites jointly formulated by academic and vocational faculty. Almost as many institutions (71%) had developed applied academic courses such as technical math and business English. A slight majority were using cross-curricular materials, such as Writing Across the Curriculum, and a substantial minority provided either "tandem" courses, where students take coordinated academic and vocational courses, and/or interdisciplinary courses, combining occupational issues and academic disciplines. While some of these activities are fairly traditional forms of integration, they can nonetheless be beneficial.

The 1993 Followup Survey enables us to assess the progress postsecondary institutions are making in these and other areas of integration. Table 4.3 shows the proportion of postsecondary institutions reporting efforts to integrate their curricula between 1990 and 1993, and also the proportions that had already taken these steps by 1990–91 (also see Appendix Table A-4.2). A comparison of Tables 4.2 and 4.3 reveals different patterns of implementation at the secondary and the postsecondary levels. At the secondary level, a great expansion of integration activities occurred in the first years of Perkins implementation. At the postsecondary level, except in faculty training, the percentages of institutions reporting integration-related measures **after** the Perkins Act were somewhat smaller than the proportions that already had taken such steps by 1990–91. Between 1990 and 1993, slightly smaller percentages of postsecondary institutions provided interdisciplinary or tandem courses, supported remedial/developmental education, or established general educational competencies than had done so by 1990–91.

These findings do not necessarily mean that some postsecondary institutions stopped their integration-related activities. For example, general education competency requirements that had been established by 1990–91 were no doubt carried forward. In many cases institutions probably did not need to do additional work on their requirements or to establish new ones; in such cases no activity on competency requirements would be reported as occurring between 1990 and 1993.

**Table 4.3**
**Percent of Postsecondary Institutions Taking Specific Steps to Integrate Academic and Vocational Education, by 1990–91 and Between 1990 and 1993**

| Steps Toward Integration | By 1990–91 | Between 1990 & 1993 |
|---|---|---|
| Support remedial/developmental education | 94 | 87 |
| Establish general educational competencies for occupational/technical students | 73 | 67 |
| Develop applied academics courses (e.g., Technical Math, Business English) | 71 | — |
| Use cross-curriculum materials (e.g., Writing Across the Curriculum) | 52 | — |
| Provide in-service training for vocational faculty on integration | 32 | 60 |
| Provide in-service training for academic faculty on integration | 24 | 48 |
| Provide "tandem" courses where students take coordinated academic and vocational courses | 40 | 30 |
| Provide interdisciplinary courses combining occupational issues and academic disciplines | 29 | 28 |

Sources: Omnibus and 1993 Followup Surveys of Postsecondary Institutions

What the findings do suggest is that two-year postsecondary institutions already had some measure of integration before the Perkins Act and that they continued their integration-related activities afterward. There was no great expansion of activities across institutions, as at the secondary level.

The notable exception to this pattern is the training of vocational and academic faculty in integration. The provision of in-service training did expand across institutions in this period, as it did across state agencies and secondary districts.

The tendency of postsecondary institutions not to change established forms of integration nor to add new ones also suggests that the effects of the Perkins Act on local postsecondary integration were limited, at least as of 1993. The principal postsecondary response to Perkins in the area of integration seems to have been to provide faculty training. However, as we saw earlier, integration efforts by

state postsecondary agencies increased markedly between 1990 and 1993, and were associated with levels of Perkins funding. It is reasonable to expect that these increased state efforts will generate more activity at the local level, as they have with performance standards.

**Funded vs. Unfunded Institutions.** The limited effects of Perkins on postsecondary integration are also evident in differences between Title II funded and unfunded institutions. As of 1992, integration efforts at the postsecondary level were not as closely related to Perkins funding as they were in secondary districts (see Appendix Table A-4.3). In every category of activity, secondary districts receiving basic grants were more likely than nonrecipients to have taken steps to integrate. The differences average 12 percentage points for regular districts and 9 percentage points for vocational districts. However, funded community colleges were more likely than unfunded colleges to have taken steps to integrate in only eight of ten possible categories, with an average difference of 6 percentage points. Among postsecondary vocational institutions, **unfunded** schools are often as likely as funded schools to report having taken steps to integrate. Among the vocational institutions, Perkins funding seems to be doing little, if anything, to promote integration.

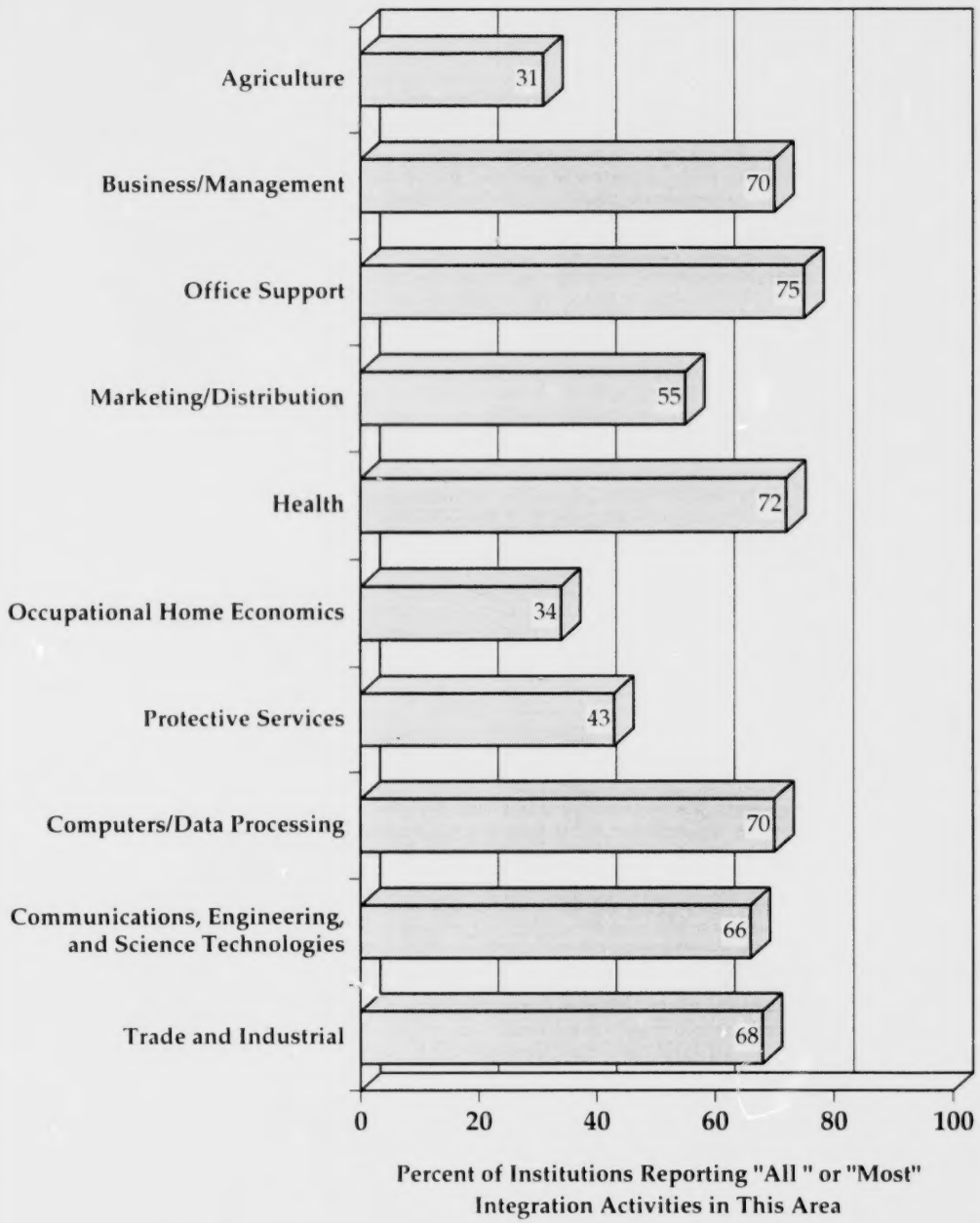
### Program Areas Integrated

Figure 4.2 shows the program areas that postsecondary institutions are integrating.[35] A comparison of this figure with Figure 5.2 in Chapter 5 makes it clear that the different occupational programs are being integrated roughly in proportion to their numbers. Postsecondary institutions were most likely to integrate programs in business and office; health; computers; communications and other technologies; and trade and industry. These are also the most widespread postsecondary occupational programs. The institutions are least likely to be integrating agriculture, occupational home economics, and protective services, the programs least frequently encountered at the postsecondary level.

## THE POTENTIAL OF INTEGRATED EDUCATION

Although it is much too early to determine the effectiveness of integrated academic and vocational curricula, it is possible to assess its potential. Over the last decade, many educational researchers have become convinced that learning in context is more effective than traditional ways of learning, such as through lectures and textbooks. Applied learning is one form of contextual education, and vocational/academic integration is one form of applied learning. Therefore an assessment of the potential for integrated education should examine the theory of contextual learning and the empirical evidence of its effectiveness.

**Figure 4.2**
**Integration Activities by Postsecondary Institutions in Given Program Areas**




Source: Omnibus Survey of Postsecondary Institutions

## Contextual Learning

A review of the literature by Karweit describes contextual learning and assesses its effectiveness. Karweit[36] expresses the core of the idea as follows:

> The traditional view of learning as abstract and generalizable is challenged by a new view of cognition as situated and specific. Rather than seeing knowing as something that is true for all time and all places, knowledge is seen to be dependent upon and embedded in the contexts and activity in which it takes place. Schools, by abstracting learning from use in an attempt to promote generalization, create unusable or inaccessible knowledge.

In comparing learning in and outside of school, Resnik, the leading theorist of contextualized education, identified four ways in which she thinks schools are dysfunctional for learning.[37] First, learning in schools is individually arranged, while in out-of-school work settings learning is shared. Second, schools emphasize unaided thought, without extensive tools and materials, while situations outside of school encourage the use of available tools. Third, schools emphasize abstraction and symbol manipulation, while real life usually requires reasoning connected to actual events and objects. Finally, schools try to teach general skills and theoretical principles, while outside of school, people usually need situationally specific, relevant knowledge.

Resnik and other advocates of the contextualized approach cite examples of people who can perform fairly complex mathematical calculations to solve real-life problems but cannot solve the same problems in the abstract, or outperform others who can. Child street vendors in Brazil, for example, used creative mathematical approaches to solve problems in their sales but could not solve the same problems using abstract theorems and a pencil-and-paper approach. Along the same lines, construction workers outperformed eighth-grade students in solving scale problems on architects' drawings. The construction workers relied on their experience in using the drawings, while the students relied on the algorithms they had been taught.

Contextualized learning's critique of traditional education has generated proposals for "cognitive apprenticeships" in which novices (students) gain experience and understanding by working on projects under the mentorship of experts. In Karweit's terms, "the process of gaining experience in apprenticeships is one of observation, coaching, and practice guided by experts as the apprentice learns particular skills." The novice learns through "successive approximation of mature practice," and "learns generality by [the] observation and experience of particulars."[38]

These are intriguing and intuitively appealing theories, but is there systematic evidence that they work? Do children learn better in contextual education than in traditional education? Some empirical research suggests that they do.

Education researchers at Vanderbilt University have conducted many experiments to test the effectiveness of a method called "anchored instruction." Essentially this approach uses videodiscs to engage children in stories and simulated situations, which serve as "anchors" for learning. That is, they provide the context within which children can observe and learn from situations, identify and solve problems, and so forth. In repeated experiments, students using the videodiscs outperformed control students in writing assignments, knowledge tests, and reasoning problems. They also had more positive attitudes toward math. At-risk students, in particular, seemed to benefit most from the anchored instruction approach.[39]

A second type of contextualized learning, called "functional context education," was developed for use in military training. The Army's 20-week course on radio repair, the first formal use of the functional context training model, starts with specific questions and problems in radio repair and moves to general theory. Only the theory needed to make a particular repair is taught. To avoid overwhelming trainees, the amount of information to be conveyed in training is reduced and carefully tailored to the content needed on the job and the time available in the course. In random-assignment experiments, functional context trainees far outperformed controls in hands-on performance tests such as troubleshooting, use of test equipment, and repair skills, although they did no better on paper-and-pencil multiple-choice tests. (Parallels with the Brazilian street vendors are intriguing.)

This experiment and others reviewed by Karweit found that the functional context training method reduced training time, reduced training attrition rates, and improved the performance of trainees. Not surprisingly, the military has made extensive use of functional context training in the 30 years since these first experiments were conducted.

The success of functional context training led the Army to adapt the approach for use in adult literacy projects. The Functional Literacy project (FLIT) related reading to task performance in various occupational areas (cook, clerk, etc.). It also moved from the particular to the general and focused on real-life applications. FLIT was composed of two modules: reading-to-do, which teaches recruits how to use manuals and other sources to look up information; and reading-to-learn, which teaches them how to read in order to understand information that will help on the job. In controlled studies, FLIT trainees showed greater gains in job-specific reading than did comparison groups that used general literacy models. However, the group differences did not meet traditional standards of statistical significance (they were between $p=.05$ and $p=.10$), and the results can only be regarded as suggestive.

Another interesting study of applied learning comes from the University of Michigan,[40] where two of eight sections in a large undergraduate political science class were randomly assigned to perform community service. The experimental students engaged in 20 hours of service with agencies which they selected from a list of course-relevant community services. At the end of the 13-week semester, not only were the attitudes and opinions of the experimental students different from those of the controls, but their classroom learning and course grades were significantly higher.

In general, there is experimental evidence that components of contextualized learning are more effective than traditional instruction. However, the experiments on anchored learning seem far afield from integrated vocational/academic education. They took place in traditional classrooms and tended to be very "academic," involving the manipulation of symbols, reading, writing, and taking tests. The Army's functional context approach comes closer to "hands-on" integrated education, but this approach involves teaching and learning highly task-specific skills through the transfer of a very limited body of knowledge. The Michigan study shows that combining classes with community service can be productive, and an analogy can be made between community service and work. But is there direct evidence from schools that integrated academic and vocational courses, or curricula, are superior to traditional teaching methods? The next section addresses this question.

**Effectiveness of Academic/Vocational Integration**

Stasz's study found that although the literature on integration contains much descriptive and anecdotal information, research on outcomes is sparse, and many of the quantitative studies have methodological problems that make it difficult to draw firm conclusions from them.

***Quantitative Studies***

Stasz reviewed ten studies that related student test scores to participation in Applied Math, Applied Communications, and Principles of Technology courses.[41] Of the ten studies, four were based on opinion surveys of teachers and students who completed applied academic courses. The findings indicated that teachers and students held generally positive views of the courses. However, the surveys were limited to opinions and have a variety of problems related to design, sampling, and/or analysis. Taken together, they do not tell us much about the effectiveness of the courses.

Three of the ten studies tested students before and after completing Applied Math and Applied Communications courses. The students' test scores increased from the beginning to the end of the courses. However, since there were no comparison groups, it is impossible to tell whether the students would have done better, worse, or about the same in regular classes.

The remaining three studies were better designed and produced results that could be called suggestive. Two studies involved the administration of pre- and post-course tests to Applied Math students and to comparison groups of students in other math courses. In one study, the students in the applied classes registered bigger test-score gains than the comparison students in "regular" math classes. In a second study, students in the applied course outperformed those in "general" math. Applied Math students in the second study also had about the same test score gains as a comparison group of students in Algebra 1.

Several recent studies, not included in Stasz's review, shed further light on Applied Math. One, at the University of Georgia[42] found that Applied Mathematics 1 and 2, each a full-year course, cover about the same material as Georgia's college preparatory Algebra 1, a one-year course. Two other studies[43] found that students who took Applied Math 1 and 2 scored as well as Algebra 1 students on tests administered at the end of the courses. While there are some methodological problems with all the Applied Math studies, the consistency of their findings strongly suggests that the two-course Applied Math sequence is roughly equivalent to Algebra 1.

The last of the ten studies reviewed by Stasz tested students in a Principles of Technology class and comparison groups of students in chemistry and biology. (Since Principles of Technology is primarily an applied physics course, physics students might have been a better comparison group. However, physics students are generally high-aptitude students, and it may not have been possible to control for large aptitude differences.) The Principles of Technology students did better on the science subtest of the Stanford Achievement Test than the chemistry and biology students, controlling for differences in general achievement as measured by other parts of the test. Once again, methodological problems such as lack of random assignment and baseline tests require that the conclusions be qualified, but the study seems to provide some evidence of the effectiveness of Principles of Technology.

***Career Magnets and Career Academies***

Two forms of integration on which good empirical research has been conducted are career magnet schools and career academies. These are schools, or programs within schools, each of which has an occupational theme and a curriculum devoted to preparation in a specific occupational field. Research on magnet schools has been conducted in New York City, and research on career academies, at various sites in California and Philadelphia. Initial results suggested that both kinds of initiatives had positive effects on student achievement and retention. Followup studies showed few additional gains, beyond those in the first year(s).

New York City has eight career magnet schools and a number of magnet programs in comprehensive high schools. The magnet schools include Aviation High School, the High School of Fashion Industries, and the Murray Bergstrom

High School for Business Careers, among others. Career magnets are not necessarily integrated at the level of individual courses. Standard English and history classes are usually still taught. Nevertheless, the programs are integrated in the sense that they have a career focus and presumably help create a community of purpose among students and teachers.

The academies are similar to the New York magnet programs in comprehensive high schools, although they tend to recruit potential dropouts, and retention is one of their major goals. As in the New York programs, there is some integration of academic and vocational subjects at the course level, though many traditional academic courses are still taught.

Crain and associates[44] took advantage of random (lottery) selection into New York magnets to conduct a natural experiment. They compared educational outcomes for lottery winners (who were admitted to magnet schools and programs) and lottery losers (who pursued a regular education in comprehensive high schools).

Their initial research on ninth-graders found that lottery winners of average reading ability (a) were less likely to drop out of school between the eighth and ninth grades; (b) gained more in reading scores; and (c) earned more credits toward graduation than their counterparts in comprehensive high schools. Below-average readers in the magnet schools (a) were less likely to drop out between the eighth and ninth grades; (b) were more likely to pass the advanced mathematics test required for the New York State Regents diploma; but (c) were also more likely to be absent than their below-average counterparts in the comprehensive high schools.

Unfortunately, most of these promising results were not found in a second study of the cohort conducted one year later. Preliminary results indicate no significant overall differences between the lottery winners and losers in the 10th grade. However, this preliminary analysis also found some differences between students randomly selected into **certain kinds** of magnet schools and programs, as compared to students who applied to those schools and programs but were not selected.[45] Among those benefiting in certain kinds of magnet settings were:

> Students in magnet schools with block scheduling, where students move as a group from one (academic) class to another;
>
> Students in magnet business and aviation programs;
>
> Students in magnet programs featuring guest speakers from business and industry (a surprisingly large effect).

On the other hand, magnet programs with an especially strong career orientation seemed to affect students with poor reading scores negatively.

Studies of California academy students and matched comparison students in the same high schools have generally found lower dropout rates among the academy students.[46] One study of nine California Peninsula academies also found that academy students had better attendance, took more course credits, had higher grade-point averages, and failed fewer courses than students in the matched samples. However, in a pattern similar to New York's, the effects were strongest in the students' first year, they declined in the second, and they disappeared in the third. Nevertheless, some first-year gains, such as reduced course failures, were not lost. Followup studies of graduates of two Peninsula academies and comparison students 27 months later found no significant differences in labor market outcomes such as employment status, wages, or hours worked.

Reduced dropout rates are a cumulative effect of the academies. They are one of the benefits that are not lost even though academy "effects" fade from year one to year three. This means that although seniors in academies are no less likely to drop out than seniors in control settings, the cohort of academy seniors includes students who probably would have dropped out earlier if they had attended other schools. Stern et al. have estimated the additional lifetime earnings likely to result from the reduced dropout rates.[47] They conclude that the increased earnings from keeping students in school are greater than the additional cost of converting regular school programs to academies, and hence constitute a net social benefit.

## INSTRUCTION IN "ALL ASPECTS OF THE INDUSTRY"

Instruction in "all aspects of [an] industry" is a form of integration that, potentially, combines skill training with a variety of academic approaches to understanding industry (e.g., its context, history, organization, processes). The Perkins Act authorizes the use of Title II funds for "programs which train adults and students for all aspects of the occupation, in which job openings are projected or available." Elsewhere, the Act strongly encourages the development of programs that educate students in all aspects of an industry.

### Arguments for This Type of Instruction

Supporters of this form of education argue that it will provide a number of benefits. First, it might promote entrepreneurship by giving students the skills they need to start their own businesses. For example, if they had an overview of their chosen industry, some basic accounting, and the essentials of investment, personnel management, and related skills, vocational completers in auto mechanics, cosmetology, or landscape design would have the fundamentals necessary to start small businesses.

Second, education in all aspects of an industry might broaden the scope and increase the level of a student's skills and abilities, facilitating career development and upward mobility within organizations. Specifically, it could

give students some of the skills they would need to move into management roles at some point.

Third, education in all aspects of an industry might be more appropriate than traditional education for the newer forms of work organization that are emerging in business and industry. For example, "high-performance workplaces" often involve job rotation, which requires the use of multiple skills.

Fourth, the development of a broader range of skills seems appropriate for employment patterns involving multiple career changes. The more skills one has, the greater one's ability to navigate these changes.

While these are reasonable arguments, we do not have empirical evidence that education in all aspects of an industry actually provides such benefits. The idea, at least in its current form, is relatively new and has not been widely adopted, nor have programs been systematically evaluated. However, we do have data from the Omnibus Survey on the implementation of "all aspects" education at the state and local levels.

**Implementation of "All Aspects of the Industry"**

The *Interim Report* found that in 1991–92, the first year of Perkins implementation, relatively few state agencies were working to promote education in all aspects of the industry.[48] Only 14–25 percent of secondary agencies and 4–15 percent of postsecondary agencies had taken specific steps toward this end.

The picture was markedly different by the spring of 1993: For most of the listed steps, the proportion of active states had at least doubled. For example, the proportion of secondary agencies providing recommended curriculum frameworks or guidelines to local districts increased from 25 percent to 60 percent. The proportion of postsecondary agencies doing so increased from 15 percent to 40 percent. Secondary agencies were more likely than postsecondary to undertake efforts to promote "all aspects" education, except in the training of teachers and counselors (about one-fourth of each type of agency reported such training).

Similar trends were reported by local districts. In 1991–92, only about one-fourth of the districts, both regular and vocational, said that education in all aspects of the industry had increased from 1990–91. However, by 1993, 68 percent of regular districts and 84 percent of vocational districts reported that activities in this area had increased in the last three years. Similar proportions of districts also said that the Perkins Act had a positive effect on "all aspects" education and that state support in this area had increased. About three-fifths of the districts indicated that teacher training on the subject had been provided.

In 1991–92, the first year of Perkins implementation, states and districts were clearly focusing on things other than education in all aspects of the industry. By the second year, the majority of states and districts had begun to take steps to implement provisions of the Perkins Act in this area.

In the longer run, the development of programs for instruction in all aspects of an industry will require more work on the concept itself. At present, instruction in all aspects of an industry is not well defined and, if taken literally, would not be feasible. A better operational definition of the concept and its applications is needed.

## CONCLUSION

The separation of academic and work-related curricula has a long history in American education. Over the years, federal policy has fostered and supported the separation of academic and vocational education. The 1990 Perkins Act is beginning to change that tendency by requiring that grant recipients integrate academic and vocational curricula.

Most states, districts, and postsecondary institutions are taking steps to integrate their curricula, and the number of educational organizations involved in this process increased after the passage of the Perkins Act — more so at the secondary than at the postsecondary level.

Funded districts and vocational districts are more likely to be active in integrating their curricula than unfunded districts and regular districts. In community colleges, Perkins funding is less likely to be associated with increased integration activity, and among postsecondary vocational institutes there is no association between funding and increased activity. Community colleges and postsecondary vocational institutes also report about the same levels of integration activity.

The *Interim Report* found that although most districts were involved in integration, the degree of involvement was not great in the first year of Perkins implementation (1991–92). For example, relatively few schools made release time available to teachers to work on integration; there was more supplementing of vocational courses than integration across curricula; and vocational teachers reported very little academic content in their courses. By the second year of Perkins implementation (1992–93), there was clear evidence of progress in efforts to integrate within districts. About half the districts made release time available to teachers for integration; over three-fourths of them reported some cross-curricular integration; and student reports suggested that the more advanced vocational courses included a substantial amount of applied academics.

While this progress at the secondary level is commendable, much more work needs to be done. The division between academic and vocational education remains deep, and there is relatively little interaction between teachers on either side. Initiatives to promote integration usually come from the vocational side and may be received less than enthusiastically by academic teachers and administrators. Moreover, integration too often has an ad hoc quality. It requires formal planning and a commitment of resources. Optimally, it should be a component in systemic reform of education designed to prepare students for work.

Given the progress between 1992 and 1993 in districts' efforts to integrate, we have asked whether additional progress at this rate would soon result in systemic integration that contextualizes learning in an occupational framework and encompasses the majority of students in secondary schools. Our case studies, site visits, anecdotal information, and published descriptions of integrated programs lead to the conclusion that the current pace of integration will not result in systemic reform in the next five to ten years.

Moreover, the level of instruction and the quality of materials in integrated secondary courses require a great deal of attention. Anecdotal and some research evidence suggest that much integrated education occurs at a very basic level. A few widely purchased applied academics packages seem to be effective, but little is known about the quality of hundreds of other commercially available materials. **The quality of these materials and of integrated course offerings should be the subject of systematic research, and the next Perkins Act should support the development of high-quality integrated curricular materials.**

Many public postsecondary institutions have had certain types of integration for a number of years. Prominent among these are academic prerequisites and co-requisites for vocational courses, determined jointly by academic and vocational faculty. The ability to develop new, cross-curricular courses is also a longstanding feature of postsecondary institutions. These forms of integration predated Perkins and continued largely unchanged afterward. Post-Perkins change is mainly evident in increased teacher training. Apart from this form of involvement, most institutions did not make additional time available to faculty to work on integration, at least as of 1992.

Although the process of implementing integration still has a long way to go, it is worth pursuing. Integrated education seems to have potential as an instructional approach. There is some empirical evidence that contextualized education is more effective than traditional academic education in learning both academic and (in the military) occupational skills. There is little evidence so far that integrated academic/vocational education in schools is more effective than other approaches, except perhaps in reducing dropout rates. However, not much good evaluation research has been done on the subject. Formal evaluations of integrated academic/vocational programs are needed.

Congress should continue to support the integration of academic and vocational curricula. There seem to be measurable benefits to students from contextualized learning. More important, the deep division between the academic and vocational cultures at the secondary level is unhealthy, often reflecting and reinforcing unequal status in public education. Federal policy should work to eliminate the division and to substantially improve the quality of education — both academic and vocational — for the majority of students who do not attain baccalaureate degrees.

Federal integration policies would probably be more effective at the secondary level if the burden of initiating and developing integrated programs did not fall primarily on vocational administrators and teachers, as it does now. While many are effective advocates of reform, their numbers are relatively small, and too often they are regarded as outside the mainstream of public secondary education. Any steps the Congress can take to encourage the active involvement of non-vocational administrators and teachers, as well as vocational educators, in the process of integration would be beneficial.

Congress and the federal government should also encourage states to undertake or continue *systemic* reforms — including the integration of academic and vocational curricula — designed to improve workforce preparation of the majority of secondary students. At least 20 states are currently considering or implementing reforms of this type, and we know that the more state support for integration districts receive, the more active they are likely to be in integrating their curricula. As recommended in Chapter 1, Congress should seek to enlist the energies of state education agencies as a whole in this process, rather than leaving state vocational educators to shoulder most of the responsibility.

## ENDNOTES

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2 Kantor & Tyack (1982), p. 35.

3 Ibid., pp. 33, 85.

4 The functions of the board were incorporated in the U.S. Office of Education in 1933, and the board itself was abolished in 1946.

5 National Commission on Excellence in Education (1983), *A Nation at Risk*, U.S. Department of Education.

6 National Commission on Secondary Vocational Education (1984), *The Unfinished Agenda: The Role of Vocational Education in High School*, National Center for Research in Vocational Education.

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12 Adelman, N.E. (1989), *The Case for Integrating Academic and Vocational Education*, Policy Study Associates.

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17 Grubb, W.N., & Stasz, C. (1993), *Integrating Academic and Vocational Education: Progress Under the Carl Perkins Amendments of 1990*, National Center for Research in Vocational Education.

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21 U.S. Department of Education (1994), *National Assessment of Vocational Education: Interim Report to Congress*, pp. 320.

22 Ibid.

23 Vocational concentrators are students who take three or more vocational courses in an occupational area (such as agriculture, business, or health).

24 Vocational specialists are students who take four or more vocational courses in an occupational area, at least two of them at an advanced level.

25 *Interim Report*, p. 320.

26 Stasz et al., (1992) pp. 28 ff. Also see Milne, A., Martindale, M., & Michie, J. (1993), *Vocational Education in Communities*, draft report prepared for the National Assessment of Vocational Education, Westat.

27 See Milne et al. (1993), pp. 69 ff.

28 Stasz et al. (1992), p. 31.

29 Some 93% and 84% of secondary and postsecondary agencies, respectively, said that state vocational officials support such efforts, while 46% and 49% said that state academic officials do.

30 Milne et al. (1993), pp. 69 ff.

31 Stasz et al. (1992), p. 7.

32 Wirt et al. (1989), p. 82.

33 Grubb & Stasz (1993), p. 27.

34 *Interim Report*, p. 322.

35 These are program areas in which vocational administrators said that "all" or "most" of the integration-related activities in their institutions were found. For a given respondent, more than one program area could be selected.

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# CHAPTER 5

# TECH-PREP PROGRAMS

## INTRODUCTION

The origins of the tech-prep movement were discussed in Chapter 1 on education reform. In the early 1980s a few community colleges had developed programs that articulated secondary and postsecondary curricula, and the idea of a program combining the last two years of secondary education with two years of postsecondary education was being discussed among small groups of educators.

The publication in 1983 of *A Nation at Risk*,[1] a key document in the broader education reform movement, crystallized sentiment among those concerned about the education of high school students who were not headed for four-year colleges. Among these was Dale Parnell, then executive director of the American Association of Community and Junior Colleges. In 1985 Parnell wrote *The Neglected Majority*,[2] which argued that *A Nation at Risk* was keyed to the interests of the 25 percent of high school students who would eventually graduate from four-year colleges, largely ignoring the majority of high school students who were not likely to complete or even enter college.

Parnell proposed a three-track curriculum for high schools: a college-bound academic program for the top quarter of students, in terms of academic interest and ability; an occupationally oriented tech-prep or two-plus-two program for the middle half; and a vocational program for the bottom quarter. The amorphous general education track, which he called "the academic and vocational wasteland of American education," would be eliminated.

The tech-prep program would prepare students for jobs in the rapidly expanding mid-level technical sector of the economy. In Parnell's view,

> The four-year 2+2 tech prep associate degree program is intended to run parallel with and not replace the current college-prep/ baccalaureate program. It will combine a common core of learning and technical education and will rest upon a foundation of basic proficiency development in math, science, communications, and technology — all in an applied setting . . . . Beginning in the junior year in high school, students will select the tech-prep program and continue for four years in a closely coordinated high school/ [community] college curriculum.[3]

Tech-prep initiatives have expanded rapidly since Parnell put this proposal on the national agenda. *The Neglected Majority* could cite only a handful of two-plus-two programs in the mid-1980s, but more recent data indicate that by 1990 over a thousand school districts and hundreds of community colleges had

combined to begin developing tech-prep programs. This rapid expansion is no doubt due, at least in part, to the fact that tech prep has a natural constituency of interested institutions. Postsecondary institutions anticipate increased enrollments of well-prepared students. Secondary vocational programs hope to stem enrollment declines and attract more high-ability students.

## THE ELEMENTS OF TECH PREP

Within the two-plus-two framework, tech-prep programs have a number of key elements. One such element, the articulation agreement, links secondary and postsecondary institutions to provide a closely coordinated high school/college curriculum. At its most basic level the articulation agreement coordinates courses in the two institutions to assure that their content and level are compatible. They may be compatible (a) in the sense that a secondary course prepares a student for a postsecondary course, or (b) in the sense that a secondary course is equivalent to a postsecondary course and that a high school student can receive advanced placement credit for completing it. Tech prep may also allow secondary students to take postsecondary courses while still in high school.

Although course articulation is essential to tech-prep programs, it is more of a building block than a finished product. The tech-prep model envisions the articulation not just of single courses but of programs — series of related academic and occupational courses — at the two educational levels. As usually understood, a fully developed tech-prep program should have an articulation agreement that covers a progressive, nonduplicative sequence of secondary and postsecondary courses leading to an associate degree in a career field.

A tech-prep program must also provide a common core of proficiency in math, science, communications, and technology in an applied setting. That is, it must not only offer a strong technical education, but do so through the integration of academic and occupational curricula. Implicit in the concept of tech prep is the idea that the secondary tech-prep curriculum should incorporate more advanced education and training than students outside the college prep track usually receive. Some educators also regard work experience programs, such as co-op or apprenticeship, or other links between school and work as essential elements of tech prep.

The Perkins Act defines tech prep as a "combined secondary and postsecondary program which:

> (A) leads to a two-year associate degree or two-year certificate;
>
> (B) provides technical preparation in at least one field of engineering technology, applied science, mechanical, industrial or practical art or trade, or agriculture, health, or business;

(C) builds student competence in mathematics, science, and communications (including through applied academics) through a sequential course of study; and

(D) leads to placement in employment."[4]

In an effort to encourage the development of tech-prep programs, Title III, Part E of the Perkins Act, called the "Tech-Prep Education Act," authorizes funds

(1) to provide planning and demonstration grants to consortia of local education agencies and postsecondary institutions, for the development and operation of 4-year programs designed to provide a tech-prep education program leading to a two-year certificate; and

(2) to provide, in a systematic manner, strong, comprehensive links between secondary schools and postsecondary institutions.

This chapter examines the development of tech-prep programs at the state, local secondary, and postsecondary levels. The basic questions include the following: How are states responding to the Perkins tech-prep provisions? How do states allocate tech-prep funds? How are tech-prep programs being implemented at the local level? What role does Perkins tech-prep funding play in implementation? What vocational programs are most likely to be included in tech prep? Do special populations have equal access to tech-prep programs?

## STATE PROGRAMS AND INITIATIVES

The Omnibus Survey asked administrators of state agencies responsible for tech-prep programs whether each of the elements in the Perkins definition of tech prep was required in order to award a Title III tech-prep Grant to an applicant.[5] (Omnibus and Followup Surveys, the major sources of data for this chapter, are discussed in the Technical Appendix in Volume V.)

As the *Interim Report* showed,[6] the great majority of states said they required most of the Perkins tech-prep elements as a condition of Title III funding:

- an articulation agreement;
- a structured sequence of courses;
- the goal of an associate degree or two-year certificate;
- technical preparation in specified occupational fields;
- demonstrated competence in math, science, and communications.

The only element required by Perkins but not by the great majority of states was placement in employment. Thirty of 49 states responding to the surveys (61%) made job placement a condition of Title III funding; the other 19 did not. Since many of the Title III applications were for new tech-prep programs whose

students might not graduate in the period covered by the grant, it is not especially disturbing that some states did not require job placement as a condition of funding.

Of course, the states' relatively strong showing on these requirements can be many steps removed from the reality of functioning tech-prep programs. First, many tech-prep applications are for grants to initiate new programs or to further develop programs still in their infancy. Hence, requiring certain program features as a condition of funding often means that the applications contain **plans** to incorporate these features in the future, rather than evidence that they already exist. Second, in cases where actual tech-prep programs are funded, there is no assurance that state requirements are really being met. Third, the survey respondents are presumably familiar with the requirements of the Perkins legislation and would be averse to reporting noncompliance.

## STATE ALLOCATION OF TECH-PREP FUNDS

Under the provisions of the Perkins Act, tech-prep grants to local consortia may be awarded competitively or on the basis of a formula determined by the state board. In fact, the great majority of states — 88 percent — make competitive awards. In 1991–92 only 6 of the 49 states responding to the survey awarded tech-prep funds through formulas. In the states where awards are competitive, the competition for grants could be characterized as real, but not fierce: Two-thirds of the applications received were funded in the first year.

In 1991–92 an average state had slightly less than $1 million of Perkins Title III money to award for tech-prep grants, and it made 13 awards of about $75,000 each to tech-prep consortia.[7] Perkins money constituted the bulk of nonlocal funding for tech-prep consortia: Only 7 of the 49 states provided separate state funding.

A year later, according to the 1993 Followup Survey, the number of states contributing money to tech-prep initiatives increased. Nineteen of 51 states joined Perkins in funding local tech-prep programs. Typically, such joint funding supported eight or nine consortia in a state.[8] In addition, eight states reported funding tech-prep consortia that received no Perkins Title III money. Two or three consortia in a state were usually funded in this way. Clearly, state support for tech prep is growing.

Community colleges are the institutions most likely to receive Title III tech-prep funds. Nationwide, 42 percent of community colleges received funds in 1991–92, as compared to 9 percent of regular school districts and 19 percent of vocational districts. However, because of the greater number of school districts, more districts than community colleges received tech-prep money — about 1,000 school districts and 500 community colleges did so in 1991–92.

## CHARACTERISTICS OF TECH-PREP SITES

At the secondary level, tech-prep initiatives tend to be located in large urban districts, vocational districts, and districts that receive Perkins Title II basic grant funds. (See Tables 5.1 and 5.2.) (In general, districts with these characteristics are among the most active in responding to provisions of the Perkins legislation.) Large districts and vocational districts are also more likely than their smaller counterparts to receive Perkins Title III tech-prep grants, but the relation between size and grant awards is not especially strong (Table 5.3). Among regular districts, the very largest are the most likely to receive Title III grants, and the smallest are least likely to do so. In the mid-range of size, which encompasses most districts, there is little relation between size and awards. Among vocational districts, only the smallest are less likely than others to receive tech-prep grants.

**Table 5.1**
**Percent of Regular and Vocational Districts With Tech-Prep Initiatives by Size of District and Urbanicity of Regular District, 1991–92**

| Regular | | Vocational | |
|---|---|---|---|
| All districts | 41 | All districts | 82 |
| Less than 1,000 students | 30 | Smallest quartile | 71 |
| 1,000–2,499 | 35 | Second quartile | 76 |
| 2,500–4,999 | 49 | Third quartile | 90 |
| 5,000–9,999 | 67 | Largest quartile | 87 |
| 10,000–24,999 | 66 | | |
| 25,000 or more | 85 | | |
| Urban | 73 | | |
| Suburban | 39 | | |
| Rural | 39 | | |

Sources: Omnibus District Surveys, Version B and Vocational

**Table 5.2**
**Percent of Regular and Vocational Districts With Tech-Prep Initiatives by Perkins Basic Grant (Title II) Funding Status**

| | Regular | | Vocational | |
|---|---|---|---|---|
| Tech Prep | Funded | Unfunded | Funded | Unfunded |
| Started before 1991–92 | 28 | 13 | 65 | 54 |
| Started in or continuing in 1991–92 | 49 | 32 | 84 | 80 |

Sources: Omnibus District Surveys, Version B and Vocational

**Table 5.3**
**Percent of Districts Receiving Perkins Title III Tech-Prep Funds by Size of District**

| Regular | | Vocational | |
|---|---|---|---|
| Student enrollments | | | |
| Less than 1,000 | 3 | Smallest quartile | 6 |
| 1,000–2,400 | 10 | Second quartile | 21 |
| 2,500-4,999 | 16 | Third quartile | 27 |
| 5,000–9,999 | 12 | Largest quartile | 22 |
| 10,000–24,999 | 12 | | |
| 25,000 or more | 32 | | |

Sources: Omnibus District Surveys, Version B and Vocational

The greater tendency of large urban districts to report tech-prep initiatives does not mean that most tech-prep efforts are located there. These districts constitute less than 5 percent of all districts; so even if every one of them had tech prep, the number of such initiatives would be dwarfed by tech-prep efforts elsewhere. In fact, most tech-prep initiatives (and most districts) are in suburban areas.

At the postsecondary level, large institutions are more likely than small ones to report having tech-prep initiatives (Table 5.4), but whether school size is related to Title III tech-prep funding depends on the type of institution. Large community colleges are no more likely than small ones to receive grants. However, among postsecondary **vocational** schools, the larger institutions do have a greater probability of receiving grants.

**Table 5.4**
**Percent of Postsecondary Institutions Reporting Tech-Prep Initiatives and Receiving Perkins Title III Tech-Prep Funding by Size of Institution**

| Student Enrollments | Community Colleges | Vocational Institutions |
|---|---|---|
| Reporting initiatives | | |
| Smallest quartile | 66 | 35 |
| Second quartile | 77 | 50 |
| Third quartile | 79 | 64 |
| Largest quartile | 82 | 64 |
| Receiving Title III funding | | |
| Smallest quartile | 39 | 6 |
| Second quartile | 42 | 22 |
| Third quartile | 44 | 38 |
| Largest quartile | 42 | 39 |

Source: Omnibus Survey of Postsecondary Institutions

## THE IMPLEMENTATION OF TECH PREP

### Extent and Size of Programs

How far along are local education systems in developing and implementing tech prep? At first glance, tech-prep programs seem to be booming. The proportion of postsecondary institutions reporting tech-prep initiatives increased from 40 percent in 1990–91 to 68 percent in 1991–92 and 74 percent in 1992–93. Similarly, the proportion of regular districts reporting tech prep increased from 23 percent in 1990–91 to 41 percent in 1991–92 and 46 percent in 1992–93.

Strong majorities of the districts and postsecondary institutions reporting tech-prep initiatives also said that they had taken major steps to implement their programs — hiring tech-prep coordinators, developing course sequences, providing teacher or counselor training, etc. (See Tables A-5.1 through A-5.3.) The proportion of respondents reporting such steps more than doubled in most categories between 1990–91 and 1991–92, no doubt reflecting the first stages of Perkins implementation. After these large increases, tech-prep activities (planned or actual) continued to expand, though less dramatically. For example, by 1990–91, 30 percent of regular districts with tech-prep initiatives had developed sequences of tech-prep courses; by 1991–92, 70 percent had done so; and by 1992–93, 86 percent had done so. In those areas for which we have common measures for 1991–92 and 1992–93, the proportions of respondents planning in 1992 to take specific implementing steps in the next year are generally equaled or exceeded by the proportions taking them in 1993. By this measure, tech-prep administrators seem to be carrying through on their plans.

There were two conspicuous areas in which tech-prep implementation was not widespread by 1992. One was developing "all aspects of the industry" curricula for use in tech-prep programs, accomplished by only 13 percent of regular districts, 19 percent of vocational districts, and 17 percent of postsecondary institutions with tech-prep initiatives. The second area was providing job placement services for tech-prep students, reported by 35 percent of regular districts, 22 percent of vocational districts, and 18 percent of postsecondary institutions with tech prep.

As we saw in the preceding chapter, "all aspects" activities increased markedly between 1992 and 1993, and it is reasonable to assume that those associated with tech prep also increased. Further, as we noted in discussing the relatively low proportion of **states** requiring placement services as a condition of Title III tech-prep funding, in 1992 most of the tech-prep programs were not far enough along to have students ready for job placement.

The widespread activity evident in the 1992 Omnibus Survey tended to obscure the fact that most of the tech-prep programs reported were not really functioning at the time. Over half of the tech-prep initiatives were just getting started in the

spring of that year, when the Omnibus Survey was in the field. Our 1992 case studies testified to the recency of most tech-prep initiatives. For example, researchers in different sites typically reported:

> "Tech prep is in its infancy in [this community]."
>
> "There is an unsigned draft of an articulation agreement [for one computer course] . . . This appears to be the only formal progress to date."
>
> "Tech prep is just a concept here; it appears to be widely supported but not well understood."
>
> "Tech prep [is] in the informational stage."

In fact, most of the tech-prep initiatives had no students in the spring of 1992: 72 percent of the postsecondary institutions reporting tech-prep said their programs had no secondary students, and 87 percent said they had no postsecondary students. Most tech-prep initiatives were still in the planning and development stages.

In the following year, tech-prep efforts began to take on more substance. By the spring of 1993, most initiatives indicated that they had at least some students, although, as we will see shortly, definitions of tech-prep programs and students vary widely. In the Followup Survey, 81 percent of school districts with tech prep could estimate the proportion of tech-prep enrollees who were female, as could 45 percent of postsecondary institutions.[9] (Part of this large one-year shift may be due to the form of the questions. In 1992 postsecondary institutions were asked to provide numbers of students in their tech-prep consortia, while in 1993 districts and postsecondary institutions with tech prep were each asked to estimate the percentage of their own tech-prep students who were female.)

Table 5.5 shows how many districts and postsecondary institutions reported in the 1993 Followup Survey that they had tech-prep programs and the features of their programs.

In the spring of 1993, a little less than half of the secondary districts (5,441 out of 11,527) and three-fourths of the postsecondary institutions (891 out of 1,200) reported having tech-prep agreements.[10] However, only about one-third of the districts (3,718) and 14 percent of postsecondary institutions (163) reported programs meeting the Perkins definition of tech prep: (a) leads to two-year degree or certificate; (b) provides technical preparation in specified fields; (c) builds student competence in math, science, and communications; and (d) integrates academic and vocational curricula. (An additional criterion — leads to placement in employment — is not included here, because most programs are too new to have student placements yet. Appendix Table A-5.4 shows what Table 5.5 would look like if student placement were added as a criterion for the definition of tech prep.)

**Table 5.5**
**Percent and Number of Tech-Prep Initiatives, Spring 1993**

| | Secondary Districts | | Postsecondary Institutions | |
|---|---|---|---|---|
| | Percent | Number | Percent | Number |
| Total (districts, institutions) | 100 | 11,527 | 100 | 1,200 |
| Report tech-prep agreement | 47 | 5,441 | 74 | 891 |
| Meet Perkins definition | 32 | 3,718 | 14 | 163 |
| Of those meeting Perkins tech-prep definition: | | | | |
| Can report percent female in tech prep | 81 | 2,993 | 45 | 73 |
| Can report percent completing secondary or postsecondary phase | 13 | 475 | 27 | 44 |
| Can report percent continuing from secondary to postsecondary | 11 | 399 | — | — |

Source: 1993 Followup Survey

The recency of these tech-prep programs is evident in the fact that 81 percent of tech-prep districts appear to have (mostly new) students; only 13 percent can estimate the proportion of students who complete the secondary part of the program; and only 11 percent can estimate the proportion who go on to postsecondary tech prep.

The ratio of secondary to postsecondary programs meeting the Perkins definition is 23 to 1 (3,718/163), much higher than the ratio in a typical consortium. This disparity may occur because secondary programs have started up and are enrolling students, while postsecondary programs are not so far along. The ratio of secondary to postsecondary tech-prep **agreements** is 6 to 1.

Despite the rapid spread of tech-prep efforts, most programs that are far enough along to enroll students are fairly small.[11] According to the Omnibus Survey, in the few regular districts reporting tech-prep enrollments in 1992, the median number of students in subject-specific tech-prep programs (agriculture, business, etc.) ranged from 18 to 27, depending on occupational field. (See Tables A-5.5 and A-5.6.) In vocational districts, the medians ranged from 16 to 40. Both regular and vocational districts typically had programs in two occupational areas. Altogether, the programs in regular districts had a median 54 students, those in vocational districts, a median 44 students.

These are not trivial numbers, and in some districts they may comprise a substantial proportion of vocational students. Nevertheless, most of the tech-prep programs reporting numbers of students are a long way from encompassing the "middle half" of high school students that are the focus of the original tech-prep model. In addition, we need to be careful in interpreting all these tech-prep estimates. Local definitions of programs and students vary widely, and many respondents may want to report on their tech-prep programs even though they do not meet survey definitions. Further, field researchers who have visited many tech-prep programs have cautioned that programs often look less substantial on site than they do in survey data.

**Retention in Tech-Prep Programs**

The 1993 Followup Survey finds that about 475 districts had Perkins-defined tech-prep programs in which some enrollees had finished the secondary part of the program and that some 399 district programs had sent students on to the postsecondary part. We can estimate student retention and transition rates for these programs. According to the district administrators, a median 79 percent of their tech-prep students complete the secondary part of the tech-prep program and 47 percent go on to the postsecondary phase. In the 44 postsecondary institutions that report tech-prep graduates, a median 58 percent of the students who enter the postsecondary phase complete the program.

These retention rates bear some resemblance to the rates for secondary students in general. In 1991, 81 percent of 19–20 year olds had graduated from high school,[12] and 38 percent of high school graduates went on to four-year colleges in the fall after graduation.[13]

We emphasize that these tech-prep retention rates are derived from administrators' estimates, the sample numbers are small, and most administrators did not provide data on these items (83% of the secondary respondents said that it was "too early to tell"). It would be better to have actual counts of students from a larger number of respondents, but such information is not available.

### Locus of Tech Prep in Secondary Schools

While Parnell conceived of tech prep as a technically oriented middle track in high school, distinct from the college prep and vocational tracks, our informal site visits, case studies, and anecdotal reports suggest that tech-prep initiatives are usually located within vocational programs and are usually perceived as a new form of vocational education.

Will this locus and this perception limit the growth of tech prep? Possibly, but several recent developments indicate that limitation of this sort need not occur, because the occupational side of secondary education is expanding in some states. As noted in Chapter 1, a few states had eliminated the general track by 1991–92, and most said that such a change was likely in the near future. A number of states, such as Maryland and Oregon, are combining elimination of the general track with the development of broad occupationally oriented programs. Within a context such as this, tech-prep programs would have ample room for growth.

### Definitions of Tech Prep

Information from site visits, case studies, written descriptions of tech-prep programs, and conversations with tech-prep field researchers and administrators also suggest that tech prep is being defined in many different ways. One definitional issue, just alluded to, is whether tech prep is essentially an old-style vocational program or a broad, integrated academic and vocational program. A second is whether postsecondary education is an essential component of tech prep. Though tech prep was initially conceived as a way of linking secondary and two-year postsecondary institutions, some advocates include work immediately after high school as a normal component of the model.[14] An informal poll of state vocational administrators in a focus group on tech prep found that 4 of 10 states considered either work after high school or an associate's degree acceptable goals of tech prep; 6 of 10 considered only an associate's degree an acceptable outcome.[15]

It is a small step from a tech-prep program whose students may or may not continue at the postsecondary level to one in which most students do not continue. In this instance, the meaning of tech prep changes substantially: It becomes something like a coherent sequence of integrated courses in an occupational "major," perhaps one that offers higher-level education than is typically found in secondary vocational programs.

Yet a third step can bring tech prep very close to the status quo: a slightly recast vocational program. For example, there are instances of relabeling in which vocational concentrators (i.e., those who take three or more courses in an occupational area) are considered tech-prep students. One pattern frequently encountered is to regard part of a tech-prep program as a whole program. Thus

an articulation agreement, or an applied academics course, or a work experience program, by itself, may be defined as a tech-prep program.

The definition of tech-prep students, like that of programs, can also be problematic. Some students may simply be taking tech-prep courses to get advanced placement credits, while others are committed to a full program. Since tech-prep courses are usually regular vocational and academic courses that fit in a tech-prep sequence, they enroll regular as well as tech-prep students. In the absence of formal enrollments, which many programs lack (see Tables A-5.5 and A-5.6), all that distinguishes a regular student from a tech-prep student may be his or her intention to continue with the program at a particular postsecondary institution. Needless to say, those intentions can often change. Along these lines, one case study of an urban community in the Southwest found that

> It is not known whether a student is a "tech-prep" student until he has reached the end of the first [semester] in [the postsecondary institution]. Thus the secondary district has no knowledge of how many "tech-prep" students there are.

**Another Perspective on Tech-Prep Implementation**

Our survey and case study findings on the implementation of tech prep parallel those in a study conducted for the Assessment in 1992 by the National Center for Research in Vocational Education. In that study, Hayward and his associates examined tech prep by surveying state offices, visiting eight sites in four regions, and reviewing the literature on tech prep.[16] They reported that their data reveal "the infancy of tech-prep throughout the country."

To assess programs, the authors identified five essential components of tech prep and determined the extent to which those elements were found in the sites visited. The components were (a) integration, (b) articulation, (c) a link between school and work, (d) core curriculum and course sequencing, and (e) emphasis on student outcomes. Their conclusions regarding the implementation of tech-prep programs were as follows:

> We found that the bulk of tech prep programs had adopted the strategy of least resistance, i.e., for the most part, only the simplest form of reform.

More specifically, to paraphrase the report,

> 1. Most of the programs were still achieving articulation on a course-by-course basis.

> 2. Most were still emphasizing advanced credit for postsecondary institutions and were not emphasizing the development of **advanced skills** in secondary courses.
>
> 3. Most "had adopted only the most rudimentary integration." While some had purchased applied academics materials, few had integrated courses across curricula.
>
> 4. Most were just beginning to develop partnership agreements with business and industry.
>
> 5. The development of core curricula was just starting. "No programs had adopted a fully developed core curriculum . . . as envisioned by Parnell." [17]

Despite the rudimentary nature of most tech-prep efforts, the authors note that:

> The few programs that have operated for at least five years have advanced their scope and objectives beyond the articulation of existing courses that merely provide advanced placement credit...[and] have incorporated completely new courses, course sequences in an entire program area, and the development of academic and vocational-technical core curricula . . . [18]

Findings from the 1992 Omnibus Survey lend some support to the observation that a few older programs are better established than most. We identified tech-prep programs in the sample of regular districts that were at least five years old and compared them with younger programs. There were only 49 of the older programs in the sample (those started in or before 1987), and 935 newer programs. (Unweighted numbers were used for this analysis.) In 1992, some 45 percent of the older tech-prep programs had formal enrollment procedures, as compared with 34 percent of those started after 1987 (a nonsignificant difference). Seventy-three percent of the older programs with formal enrollments reported numbers of students participating, while only 36 percent of the newer programs did. Further, the mean number of tech-prep students reported in the older programs was 66, while the mean number in the newer programs was 44.

Our case studies show that the process of developing and implementing tech-prep programs can be long and arduous — often time consuming and fraught with scheduling and personnel problems, turf battles, competition for resources, and a range of other difficulties. Some postsecondary institutions have to develop articulation agreements, course by course, with several different school districts each with different curricular offerings, schedules, organizational characteristics, and staff personalities.

We do not know how many of the current tech-prep initiatives will survive, and how many will develop into mature programs. The first does not imply the second, because a new tech-prep initiative could continue as a simple advanced placement program for a long time, without becoming a fully developed tech-prep program. The maturation of tech-prep initiatives and the nature and extent of student participation, student retention, and student outcomes are subjects that will require close scrutiny in the future.

## THE ROLE OF PERKINS IN LOCAL TECH-PREP EFFORTS

The discussion of implementation suggested that the Perkins Act was responsible for the rapid growth in the number of tech-prep initiatives in the early 1990s. For example, in 1990–91, the last year under the old Perkins Act, 23 percent of regular districts reported having tech-prep programs. In 1991–92, the first year of the new Act, 41 percent of districts reported doing so, a relative increase of 78 percent. New starts then leveled off: 1992–93 saw only a 12 percent relative increase in the number of districts with tech prep, from 41 percent to 46 percent.

Further, district administrators often credit Perkins with influencing their decisions to undertake tech-prep initiatives. In the 1993 Followup Survey, 43 percent of administrators in all districts with tech prep said the Perkins Act played a large role in their decision to develop a tech-prep program. The Act was cited as an important influence more often than any other factor in a list of eight, in part, no doubt, because of the grant money it provides for tech prep.

Finally, multivariate analyses in Chapter 1 showed that the perceived influence of Perkins in districts was associated with a greater increase in the number of steps taken to implement tech prep than was any other factor.

Beyond the general influence of Perkins on tech prep, we would expect school districts and postsecondary institutions receiving Perkins Title III tech-prep grants to have more fully developed tech-prep initiatives than those not receiving grants. Indeed, the Omnibus Survey data show that among the school districts developing tech prep, those receiving Title III funds are more likely to have taken specific implementation steps than those without funds (Table 5.6). This is true of every category of activity in both regular and vocational districts.

The evidence also suggests that Perkins tech-prep funds may have more impact in vocational districts than in regular districts. In seven of the ten implementation steps listed, the difference between funded and unfunded vocational districts is greater than the difference between funded and unfunded regular districts.

At the postsecondary level, Title III fund recipients are more likely than other institutions to take certain steps to develop tech-prep programs, but the tendency is not as pronounced as at the secondary level (Table 5.7). Funded community colleges are more likely than unfunded ones to hire tech-prep coordinators,

**Table 5.6**
**Secondary Districts' Steps Toward Tech Prep**
**by Perkins Title III Funding Status, 1991–92 (Percent of Districts)**

| Steps Toward Tech Prep | Regular | | Vocational | |
|---|---|---|---|---|
| | Funded | Unfunded | Funded | Unfunded |
| Hold tech-prep meetings with local secondary institution(s) | 100 | 90 | 100 | 96 |
| Form consortium with other local educational agencies for tech-prep purposes | 92 | 79 | 90 | 83 |
| Provide teacher or counselor training on tech prep | 87 | 78 | 86 | 68 |
| Modify curricula for tech prep | 81 | 73 | 95 | 76 |
| Develop course sequence(s) for tech prep | 79 | 68 | 90 | 75 |
| Develop activities or programs to prepare students for tech-prep option | 88 | 68 | 88 | 70 |
| Tech-prep policy adopted by governing board | 73 | 65 | 88 | 63 |
| Establish formal tech-prep enrollment procedures | 87 | 80 | 69 | 50 |
| Employ a tech-prep coordinator | 49 | 35 | 77 | 35 |
| Develop "all aspects of the industry" curriculum for use in tech-prep program | 44 | 33 | 69 | 43 |

Sources: Omnibus District Surveys, Version B and Vocational

sponsor joint training of secondary and postsecondary instructors, and have formal tech-prep policies from their governing boards. In other areas, funded community colleges are rather similar to unfunded colleges.

In postsecondary **vocational** institutions the relation between funding and the probability of taking steps to implement tech prep is stronger. As with community colleges, funded vocational institutions are more likely than others to

**Table 5.7**
**Steps to Implement Tech Prep in Postsecondary Institutions by Perkins Title III Funding Status, 1991-92 (Percent of Institutions)**

| Steps Toward Tech Prep | Community Colleges | | Vocational Institutes | |
|---|---|---|---|---|
| | Funded | Unfunded | Funded | Unfunded |
| Hold tech-prep meetings with local school districts and/or schools | 98 | 97 | 100 | 95 |
| Develop articulation agreement(s) with local school districts and/or schools | 96 | 95 | 93 | 85 |
| Collaboration between secondary and postsecondary instructors to modify course content | 85 | 84 | 91 | 79 |
| Grant postsecondary credit for high school courses | 78 | 79 | 78 | 69 |
| Establish secondary/postsecondary majors or career paths | 77 | 76 | 81 | 79 |
| Tech-prep policy adopted by governing board | 78 | 67 | 83 | 71 |
| Establish non-duplicative sequence of secondary and postsecondary tech-prep courses | 75 | 69 | 87 | 68 |
| Provide written publicity about tech-prep program(s) to high school students | 71 | 62 | 80 | 61 |
| Joint training of secondary and postsecondary instructors | 74 | 52 | 85 | 56 |
| Modify postsecondary curricula for tech prep | 62 | 58 | 60 | 46 |
| Employ a tech-prep coordinator | 75 | 44 | 85 | 42 |
| Develop "all aspects of the industry" curriculum for use in tech-prep program | 43 | 39 | 57 | 51 |

Source: Omnibus Survey of Postsecondary Institutions

hire tech-prep coordinators, sponsor joint training of teachers, and have formal tech-prep policies. However, they are also more likely to establish sequences of courses, report collaboration between secondary and postsecondary instructors, and grant postsecondary credit for high school courses.

In community colleges, then, steps to develop tech prep often occur without the incentive of Title III funding, perhaps reflecting the fact that tech prep got its start in community colleges before the Perkins Act was passed. Funding seems to enhance the ability of community colleges to take certain steps that have specific costs associated with them, such as hiring tech-prep coordinators and providing in-service training. Title III funding of vocational institutions is associated more consistently with tech-prep implementation than is the funding of community colleges.

### Title III Funding and the Initiation of Tech-Prep Programs

We need to be cautious about interpreting the relation between Title III funding and increased program implementation as evidence of a Perkins effect on tech prep, however. Districts and postsecondary institutions that have **already started** tech-prep initiatives are more likely to receive Title III funds than those that have not (Table 5.8).

**Table 5.8**
**Districts and Postsecondary Institutions Receiving Title III Tech-Prep Funds by Presence or Absence of Tech-Prep Initiatives Before 1991–92**

| | Districts With Tech-Prep Initiatives Before 1991–92 | | Districts With No Tech-Prep Initiatives Before 1991–92 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| Regular districts | 489 | 26 | 301 | 5 |
| Vocational districts | 40 | 28 | 5 | 6 |
| Postsecondary institutions | 161 | 47 | 143 | 29 |

Sources: Omnibus Surveys of Regular Districts (Version B), Vocational Districts, and Postsecondary Institutions

Some 26–28 percent of districts (regular, vocational) that had tech-prep initiatives **before** 1991–92 got Perkins tech-prep funds, compared to only 5–6 percent of the districts that had **no** initiatives before 1991–92. Similarly, 47 percent of postsecondary institutions that already had tech-prep initiatives got Title III grants, as compared to 29 percent of those that had no previous tech-prep efforts. From this perspective, more implementation of tech prep might be "causing" Perkins Title III funding to occur, rather than the other way around.

There are probably straightforward reasons for this pattern of allocation. As we have seen, most Title III grants are awarded on a competitive basis, and districts that have already started tech-prep programs may be more likely to apply for grants than those that have not. Because they are more familiar with tech prep, administrators in these districts may also write better grant applications. In any case, one effect of tech-prep grants seems to be to enable districts with existing tech-prep initiatives to develop those efforts further and/or to develop new tech-prep programs in other subject areas.

Because Perkins Title III money tends to go to districts that have some experience with tech prep, new programs are being initiated more rapidly in districts that did not receive tech-prep funds in 1991–92. Among regular districts, the proportion of unfunded districts with tech-prep initiatives increased 110 percent between 1990–91 and 1991–92; the proportion of districts with Title III funds increased only 33 percent. Among vocational districts the differences were less pronounced but still substantial: The proportion of unfunded districts with tech prep increased 34 percent, while the proportion of districts with Title III funds increased only 12 percent. The creation of tech-prep initiatives in new districts occurs largely without the benefit of Perkins tech-prep grants, although the more general influence of the Perkins Act may have promoted this growth.

The fact that tech-prep grants are not the primary stimulus in the creation of new programs does not detract from their value. It is probably more important at this point to further develop and give structure to existing tech-prep programs than to start new ones.

### Is Tech Prep High-Tech?

The term "tech prep" connotes education in highly technical fields, such as electronics and computer systems, and Parnell's model emphasizes preparation for technical work. Title III of the Perkins Act also calls for technical education but defines eligible program areas broadly: Tech prep should provide "technical preparation in at least one field of engineering technology, applied science, mechanical, industrial, or practical art or trade, or agriculture, health or business."[19] In effect, all the major vocational program areas are included. What subjects are most often found in tech-prep programs, and what subjects are least often included? How does the distribution of tech-prep subjects compare to that of vocational education in general?

At the secondary level, tech-prep programs are most often found in business and office education and in trade and industry (Figure 5.1). In regular districts, 30 percent of the subject-specific tech-prep programs are in business and office, and 27 percent are in trade and industry. Some 10–11 percent of the tech-prep programs are found in each of the other four occupational areas listed. Judged by the proportion of teachers in the different occupational areas, the distribution of tech-prep initiatives is roughly similar to that of vocational programs in general, although tech prep is underrepresented in business programs; it may be overrepresented in marketing, occupational home economics, and health, but these differences may not be significant.

At the postsecondary level, the distribution of tech-prep initiatives across different vocational fields resembles the distribution of postsecondary occupational programs in general, with the possible exception of protective services (Figure 5.2). Computer and data processing programs are represented among tech-prep programs exactly in proportion to their numbers; communications, engineering, and science technology are only slightly over-represented among tech-prep programs. In short, if vocational program areas reflect different degrees of technical emphasis, there seems to be no particular concentration of high-tech subjects in tech prep. It may be that tech-prep programs have a high-tech emphasis **within** vocational program areas, but we have no data with which to explore that possibility.

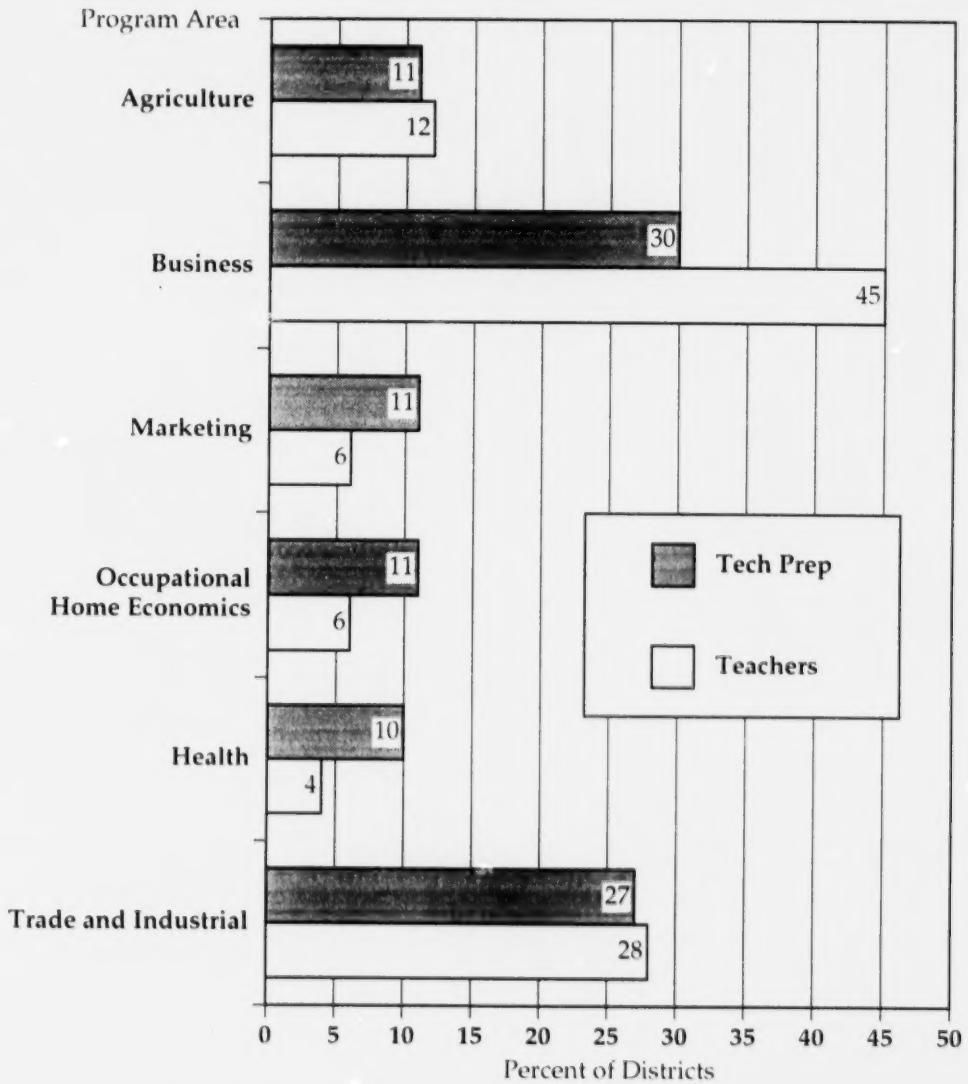
**Do Tech-Prep Programs Provide Equal Access?**

The Perkins Act requires basic grant recipients to provide special population students with equal access to "good quality" vocational education programs, and tech-prep programs may be regarded as one measure of quality. Perkins also explicitly requires that districts receiving Title III tech-prep grants provide special populations with equal access to tech-prep programs.[20]

One way to determine the degree of access is to use the "equal opportunity" model, in which there are no external barriers to opportunity based on characteristics such as sex, race, or disability status. This model opens the door to opportunity structures (such as tech-prep programs) but does not assure that disadvantaged individuals will participate in significant numbers. A second approach to access, the affirmative action model, aims to assure significant participation for disadvantaged individuals by making active efforts to recruit and involve them. We will evaluate access to tech prep for special population students by reference to both of these models.

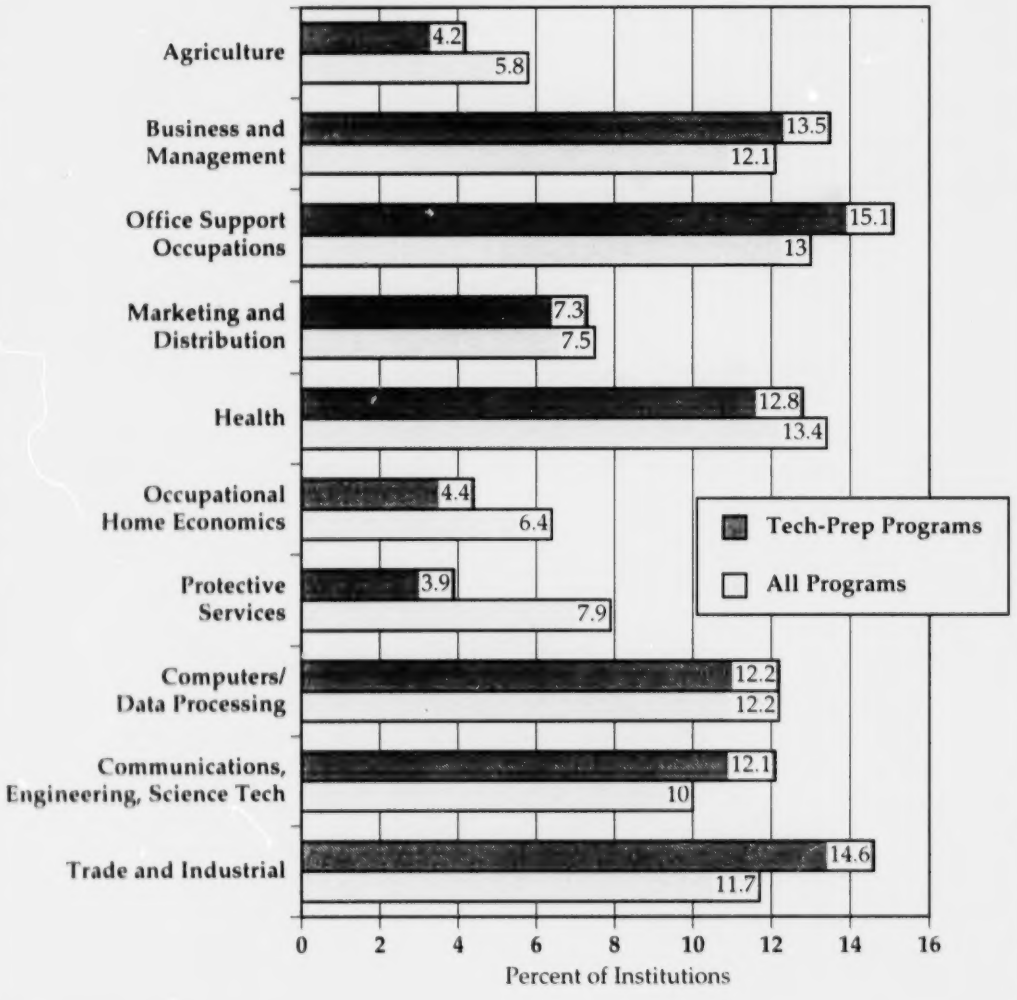
Using the equal opportunity approach, we can examine the prevalence of tech-prep initiatives across districts with different proportions of special populations. If the districts have about the same prevalence of tech-prep programs, then the programs are distributed across districts without regard to the special population status of students.

**Figure 5.1**
**Percent of Tech-Prep Programs and of Secondary Vocational Teachers, by Program Area**




Sources: Omnibus District Surveys, Version B; National Assessment of Vocational Education Teacher Survey

**Figure 5.2**
**Percent of Tech-Prep Programs and All Vocational Programs in Postsecondary Education, by Program Area**




Source: Omnibus Survey of Postsecondary Institutions

The survey data show that the occurrence of tech-prep initiatives is unrelated to proportions of special population students (Table 5.9). Districts with high proportions of special populations are as likely to be developing tech prep as those with low proportions.

For Title III tech-prep grants, however, the picture is a little different. Districts with low proportions of special populations are about as likely to receive grants

**Table 5.9**
**Percent of Regular and Vocational Districts With Tech-Prep Programs and Title III Tech-Prep Programs, by Proportion of Special Population Students in District, 1991–92**

| Proportion of Special Populations | Regular | Vocational |
|---|---|---|
| Tech-prep program | | |
| Lowest quartile | 44 | 83 |
| Second quartile | 39 | 79 |
| Third quartile | 41 | 84 |
| Highest quartile | 41 | 80 |
| Title III tech-prep grant | | |
| Lowest quartile | 11 | 23 |
| Second quartile | 11 | 17 |
| Third quartile | 7 | 13 |
| Highest quartile | 9 | 24 |

Sources: Omnibus District Surveys, Version B and Vocational

as districts with high proportions. However, districts with the next-to-highest proportions (third quartile) of special populations are less likely than districts with low proportions to receive Title III grants. This outcome is no doubt the byproduct of tech-prep funding decisions made on other grounds, but it does fall short of equal access in this model. However, these measures of tech prep are not very precise, and it is difficult to interpret this finding.

Data from the 1993 Followup Survey enable us to assess the extent to which school districts and postsecondary institutions are using an affirmative action approach to assure that special population students are included in tech-prep programs. Table 5.10 shows the proportions of school districts and postsecondary institutions saying that they (a) actively recruit special population students to tech prep; (b) monitor the participation of special populations in tech prep; and (c) have developed tech-prep programs in occupational areas with high proportions of special population students (in effect, bringing the program to the student).

About 70 percent of the institutions with tech prep actively recruit special population students to their programs, and similar proportions (68–72%) monitor

**Table 5.10**
**Percent of Tech-Prep Institutions Taking Active Steps to Assure Access for Special Populations**

| Steps to Assure Access | Regular Districts | Vocational Districts | Postsecondary Institutions |
|---|---|---|---|
| Active recruitment of special population students | 70 | 71 | 71 |
| Monitoring participation of special population students | 71 | 68 | 72 |
| Developing tech prep in vocational program areas with high proportions of special population students | 55 | 54 | 63 |

Sources: Omnibus District Surveys, Version B and Vocational

their participation. Somewhat fewer institutions (54–63%) have developed tech-prep programs in occupational areas with high proportions of special population students.

In addition, the Omnibus Survey asked administrators in districts with tech prep whether their subject-specific tech-prep programs included provisions for special populations, an approach consistent with affirmative action. In both regular and vocational districts, about two-thirds of the programs have such provisions but one-third do not (see Tables A-5.5 and A-5.6).

In Title III-funded districts, where Perkins explicitly requires equal access to tech prep for special populations, the proportion of tech-prep programs including provisions for these students is higher, ranging from 73 percent to 86 percent in regular districts and 68 to 91 percent in vocational districts, depending on program area. (See Table 5.11.)

In the case study sites, many of which are Title III recipients, special population students tend to be a secondary consideration in developing tech prep. The case study summary observes that while some districts do target their programs on special population students, "most other districts are targeting their tech-prep

**Table 5.11**
**Percent of Districts With Title III Tech-Prep Programs That Have Provisions for Special Population Students**

| Program | Regular Districts | Vocational Districts |
|---|---|---|
| Agriculture | 80 | 91 |
| Business/office | 74 | 72 |
| Marketing | 68 | 81 |
| Occupational home economics | 73 | 80 |
| Health | 84 | 72 |
| Trade and industry | 86 | 68 |

Sources: Omnibus District Surveys, Version B and Vocational

courses on students who are neither members of special populations . . . nor top college-bound students."[21] This focus on students in the middle half is, of course, part of the original concept of tech prep. The districts in these case studies tend to see tech prep as a way to attract a broader range of students to vocational education.

In sum, special population students are usually not a priority in the development of tech-prep programs, although the majority of programs are making an effort to assure that they are included. The Perkins Act clearly envisions an activist approach to improving the education of special population students, and tech prep is integral to the Perkins strategy. On balance, we think that more attention should be paid to developing tech-prep programs in sites with high concentrations of special populations and preparing such students to enter tech-prep programs and benefit from them, whatever their location.

## CONCLUSION

The number of tech-prep initiatives has grown remarkably since the concept was introduced in the mid-1980s; the Perkins Act added impetus to a movement well under way. By 1993, about 5,400 out of 11,500 secondary school districts reported some tech-prep activities. However, the estimated number of programs becomes much smaller when the definition of a program becomes more restrictive. About 400 secondary programs meet the Perkins criteria for tech prep and have graduated at least some students; 73 postsecondary programs meet the criteria and have students participating. The majority of reported tech-prep initiatives

were just getting started in 1992, and most of these enrolled their first students in 1993.

Judging from the enrollments reported by a relatively small number of districts and postsecondary institutions in 1992, most functioning tech-prep programs are of modest size — around 50 students in a district and 120 secondary students in a consortium.

Many programs include postsecondary education as an essential component, but some do not. Many are conceived primarily as articulated vocational courses, but a smaller number are designed as broad, integrated, occupationally oriented majors. Some are merely relabeled tech-prep components. Some require formal student enrollments, but in others the definition of a tech-prep student is hazy.

In 1992, case studies found that most secondary-postsecondary articulation occurred at the course level, not the program level. Though many tech-prep initiatives reported some integration in our surveys, at visited sites most of the integration appeared to be rudimentary.

Most schools and postsecondary institutions seem to be trying to fit small tech-prep programs or pieces of programs into their existing curricula, rather than using them as a basis for the kind of systemic reform implicit in the Perkins Act. A critical question is whether tech prep will be simply one of the options within the present vocational education system, or whether it will expand into a broad integrated program encompassing a substantial portion of the secondary student body.

Hayward and his associates observe that:

> All in all, one might be inclined to look at the results with disappointment. However, in our view, that would be an ill-advised conclusion. These results are precisely what one would expect from a very new, very complex education reform.[22]

Hayward notes that the few programs that have operated for at least five years seem to be doing well, and some survey findings are consistent with this observation. Not surprisingly, older programs are more likely to be larger than newer ones.

We do not know how many of the new initiatives will survive for at least five years, or how many have the potential, in terms of mandate, commitment, resources, and structural prerequisites to endure or to evolve into comprehensive programs.

There are some positive signs, though. Tech prep looked better in 1993 than in 1992. One could see students beginning to enter the programs, and in the few

districts that could provide estimates, the rates of transition to postsecondary institutions are fairly respectable — a median 47 percent. Moreover, it appears that specific plans made in 1992 for the following year were often carried out.

Programs will have a better chance of achieving breadth and coherence if systemic tech-prep reform is supported by state policy. The fact that more states contributed funds for tech prep in 1993 than 1992 is encouraging, and suggests some momentum at the state level. New York and South Carolina are calling for tech-prep programs that resemble the Perkins model. Other states, such as Indiana and Maryland, also have official tech-prep policies.

Tech-prep programs should have the opportunity to grow and develop further. **The new Perkins Act should continue to support tech prep and should seek to gain the active cooperation of the states in bringing greater coherence and clearer definition to tech-prep programs. At the same time, the government should monitor and evaluate these programs, using longitudinal studies of student participation, retention, and educational and employment outcomes.** We need to know how many students participate in tech prep, how many move from secondary to postsecondary institutions, and how many attain postsecondary certification.

**The next Perkins Act should require states to verify that recipients of tech-prep grants are developing comprehensive, structured tech-prep programs, as outlined below.** A few articulated vocational courses or applied academic courses do not constitute a tech-prep program, although they may be the first steps in developing one. **The new Act should stress that tech-prep programs must be based on articulation at the level of occupational or industry majors, with the full complement of appropriate academics. The new Act should also require that tech-prep grant recipients formally enroll tech-prep students and track their progress through the program.**

Further, given the positive labor market returns to postsecondary education, **the next Perkins Act should continue to emphasize that federally funded tech-prep programs must be designed as secondary/postsecondary programs that have associate-level degrees or certificates as their goal. It should also encourage recipients to seek out ways to maximize the rate of transition between secondary and postsecondary institutions.**

**Finally, the new Perkins Act should place greater emphasis on developing tech-prep programs in sites with high concentrations of special population students and preparing special needs students for tech-prep programs, regardless of location.**

## ENDNOTES

1 National Commission on Excellence in Education (1983), *A Nation at Risk: The Imperative for Education Reform*, U.S. Department of Education.

2 Parnell, D. (1985), *The Neglected Majority*, Community College Press.

3 Ibid., pp. 143-44.

4 Sec. 347 (3).

5 A note on methodology: State secondary and postsecondary agencies were asked to identify themselves as solely responsible for tech prep in their states, jointly responsible, or not responsible. The purpose was to produce one respondent to tech-prep questions for each state. If a state agency identified itself as solely responsible for tech prep, and was the only one doing so, its responses were used. If secondary and postsecondary agencies said they were jointly responsible, preference was given to the latter, because postsecondary institutions in the past have typically been the initiators of tech-prep programs. In some instances both secondary and postsecondary agencies in a state claimed sole responsibility for tech-prep programs. The reasons for these apparently conflicting claims are unclear, but in these cases only the postsecondary responses were used for analysis. However, differences between the two types of agencies were small, and either or both could have been used without changing the results substantially. The data here reflect the responses of 48 regular states (not territories) and the District of Columbia.

6 U.S. Department of Education (1994), *National Assessment of Vocational Education, Interim Report to Congress*, pp. 343-345.

7 The mean dollar amounts are $958,821 for an average state and $73,755 for an average grant to a consortium.

8 Medians are used to characterize a "typical" number of consortia.

9 The median percentages of tech-prep students who are female are as follows: regular districts 38%; vocational districts 41%; postsecondary institutions 50%.

10 For secondary districts, tech prep was defined broadly as "a program that: involves an articulation agreement with a community or technical college or two-year apprenticeship program; and (2) provides at least two years of secondary and two years of postsecondary courses or apprenticeship leading to an associate's degree or two-year certificate in a specific career field." Postsecondary institutions were given comparable definitions. Then respondents were given a list of specific attributes of well-developed tech-prep programs and asked whether their tech-prep initiatives had each of these attributes.

11 This analysis uses medians rather than means to characterize tech-prep programs. The mean numbers of tech-prep students reported are much higher than the medians. The mean for regular districts is 98; that for vocational districts is 129; that for consortia reported by postsecondary institutions is 280 secondary students and 96 postsecondary students. However, the means are affected by a small number of districts and postsecondary institutions that report very large numbers of tech-prep students. The largest tech-prep program in a regular district in the survey reported 1,257 students; the largest program in a

vocational district, 789 students. Four postsecondary institutions each reported tech-prep enrollments of 20,000. The latter probably reflects double counting resulting from four postsecondary institutions in a system reporting on a tech-prep program they share in common. Even then, case study and other on-site investigations suggest that an estimate of 5,000 students in a tech-prep consortium may be high.

12 Alsalam, N., et al. (1993), *The Condition of Education, 1993,* p. 58, National Center for Education Statistics.

13 Ibid., p. 24.

14 For example, see Hull, D. (1993), *Every Student Wins: Delivering Education That Works,* pp. 17–18, Center for Occupational Research and Development. Hull considers it likely that half of tech-prep graduates will go to work immediately after high school. Such students can continue their studies toward an associate degree later on, in this conception of tech prep.

15 Based on a National Assessment of Vocational Education focus group on tech prep, held at the meeting of the National Association of State Directors of Vocational and Technical Education, Kansas City, September 15, 1992.

16 The information in this discussion comes from Hayward, G.C., et al. (1993), *A Literature Review for Tech Prep,* National Center for Research in Vocational Education.

17 Hayward et al. (1993), pp. 43–44.

18 Ibid., p. 15.

19 Sec. 347 (3) (B).

20 Sec. 240 (1) (B) (4); Sec. 344 (b) (6).

21 Milne, A., Martindale, M., & Michie, J. (1993), *Vocational Education in Communities,* Westat.

22 Hayward et al. (1993), p. 44.

# CHAPTER 6

# WORK-BASED LEARNING

## INTRODUCTION

Nearly half of America's youth leave high school with the expectation of entering the labor market, rather than continuing their education. However, the United States has few institutional linkages to assist non-college-bound youth with the transition from school to work. The high rate of unemployment among youth with no postsecondary education or training, coupled with the growing concern that the skills of our workforce must be upgraded to compete in an ever more technologically advanced global economy, have sparked a new interest in work-based education.

### Employment Status of High School Graduates

Data on the labor force participation of youth with no postsecondary education show a pattern of moving from one short-term, low-wage, "dead-end" job to another, interspersed with periods of unemployment. By age 30, almost one-third of men are working in jobs they have held for under a year. Another 16 percent have been employed for just one year. The pattern is similar for women who have been in the labor market for the same amount of time.[1]

The General Accounting Office reports that U.S. schools direct students toward college, where education and training resources are concentrated.[2] However, those who never enter college cannot benefit from this public investment. At the same time, employers who offer good wages, attractive benefits, and internal career ladders have first pick in the labor market; and they rarely choose high school graduates who have no further education. Firms best equipped to provide high-quality training to their employees invariably choose older, more mature workers for their entry-level career opportunities.[3]

In contrast to the American system, Japanese firms have semi-formal, long-term agreements with high schools. As a result, Japanese schools play a far more active role in introducing students into the labor force. In Japan, the best firms hire the highest achieving students from the best high schools. This provides an economic incentive for students to excel at the high school level. While many American young people move from one short-term, low-expectation job to another and receive little orientation to available careers or necessary training in their high school years, their counterparts in some other countries gain pride, master increasingly difficult skills, and acquire experience working in the adult world.[4]

Some researchers argue that the instability in the early years of labor force participation by these young people is not a problem in itself. [5] Rather, they see this period as one wherein young people experiment with a variety of occupations. They note that American youth can and do exercise far more choice than their European or Japanese counterparts. Even those who see this period as one of freedom and choice realize, however, that for certain subgroups, particularly minority youth, the lack of structure in the transition from school to work contributes to labor market difficulties. According to 1990 data, only 29 percent of black high school dropouts between the ages of 16 and 24 are working at any job, compared with 57 percent of whites. Likewise, only a little more than half of all black youth with high school diplomas are employed — 55 percent compared with 79 percent of whites.[6]

**The Rising Demand for Higher Skill Levels**

The issue of increasing demand for higher skills continues to attract a lot of attention in the popular press. Critics argue that many American workers do not possess the skills necessary to succeed in the labor market. This is thought to be especially true for those young people who do not go into postsecondary education. For youth, it is often said that their reading, writing, math, and communications skills are generally inadequate for the demands of today's employers. (The introduction to Volume II of this report examines the changing skill requirements of the labor market in more detail.)

New forms of work organization are emerging in American business and industry in response to the pressure of international economic competition. Sometimes referred to as the "high-performance workplace," these innovations usually include the devolution of more decision-making power to front-line workers and an emphasis on activities such as teamwork, job rotation, quality control, and employee problem-solving groups (quality circles).

The Volume II introduction showed that an increasing number of firms are adopting this approach. About one-third of firms with more than 50 employees have adopted significant elements of the high-performance workplace, and the proportions of larger firms doing so are considerably higher. These findings indicate that significant changes are occurring in the structure of the workplace, and that they put a premium on conceptual and technical skills.

**The Role of Work Experience Programs**

As we saw earlier, academic and vocational integration, tech prep, and work experience programs such as cooperative education and new youth apprenticeships are usually regarded as critical to improving the school-to-work transition. Having just examined integration (Chapter 4) and tech prep (Chapter 5) , we turn to a discussion of work experience programs.

Work experience programs are gaining support from all levels of government. At the federal level, the School-to-Work Opportunities Act is designed to promote successful school-to-work transition; at the state and local level, new work-based programs abound (see Chapter 1).

Advocates of these programs believe that they show strong potential to help the United States compete in global markets by improving workforce preparation and facilitating the transition to work. Work experience programs have been developed in an effort to improve both the occupational and the academic options of young people who will not earn a four-year baccalaureate degree.

Largely on the basis of qualitative data, the General Accounting Office concluded that both students and employers can benefit from participating in **high-quality** work experience programs. Students attain work experience and job skills, and increase the likelihood of permanent employment after completing their education. Employers gain access to a prescreened pool of employees. Students participating in work experience programs are more likely to stay in school and pursue additional education, according to co-op coordinators interviewed by GAO.[7] Later, we will examine systematic quantitative studies bearing on these issues.

The remaining sections of this chapter will review the major work experience programs that are available to high school students and students in two-year colleges. Where data are available, results of program evaluations also will be presented.

## WORK EXPERIENCE PROGRAMS FOR HIGH SCHOOL STUDENTS

For those still in high school, programs to strengthen the link between school and work tend to fall into two general categories. The first category includes programs that build on classroom teaching by bringing work and career issues into the curriculum. This type of approach includes integrated models such as career magnet schools and career academies; it also includes tech-prep programs. The previous two chapters examined these reform strategies.

This chapter focuses on the second approach — programs that get young people out of the classroom and into workplace settings. These efforts, broadly referred to as work experience programs, include formal work-based training programs outside the school, such as cooperative education and youth apprenticeship, and school-based enterprises. Although not part of any formal program, students working on their own initiative while still in high school are also of interest, and research on this activity will also be examined.

**Co-op Programs**

Co-op education is run by individual schools as part of their vocational education programs. Students are provided part-time jobs during the school year in their field of vocational specialization. The job placements are arranged by the classroom vocational instructor or by the school's co-op coordinator. A training plan that clearly states what the student is expected to learn and what the employer is expected to provide is developed. Business and marketing programs are currently the largest sponsors of co-op education.

According to the Omnibus Survey, approximately 403,000 secondary students participate in co-op programs; that is about 4 percent of the students in grades 9–12. This estimate is close to one from the General Accounting Office, which found that approximately 450,000 students, or 8 percent of those in grades 11 and 12, participate in co-op.[8] In fact, co-op is the most commonly available option for work-based learning in the United States, and is offered in about half of all secondary schools.[9]

Co-op programs are not aimed at any particular segment of the population, and they were not established exclusively to serve poor youth, minorities, or underachievers. The demographic information on program participants shows, however, that while co-ops serve a broad range of students, they do serve a disproportionate share of lower achievers. A survey of state vocational education directors, conducted by the General Accounting Office[10] in 1990, revealed that 76 percent of all co-op students were white and 48 percent were male. They tended to have lower than average test scores and to come from lower socioeconomic levels. Fifty-nine percent of co-op participants came from the lower half of the socioeconomic status distribution, and 70 percent from the lower half of the test score distribution. In terms of these characteristics, co-op students resemble secondary vocational students in general.

The GAO also determined that participant characteristics varied with the perceived quality of the program. "Programs that were viewed as being of higher quality had higher admission standards and participation rates, whereas those programs that carried the negative stereotype of vocational programs had fewer applicants and were therefore less selective." They found that most programs have admission standards that require co-op students to maintain an average GPA (at least 2.0 in most programs), good attendance, and a positive attitude, and to demonstrate a lack of disciplinary problems.

**Evaluation Findings.** Overall, few hard data exist to permit a rigorous evaluation of co-op programs. The data that are available show a higher level of satisfaction with school among co-op students, as well as an improved attitude toward both school and work, but the data on economic outcomes are mixed.

Some of the empirical evidence suggests that co-op education does contribute to clarification of career goals, self-confidence, awareness of interpersonal relations, and increased motivation. [11] Although general impressions of co-op education are almost always positive, a review of evaluation literature by Stern et al. [12] suggests that while "research does find that co-op students are relatively satisfied with school . . . there is not consistent evidence that they learn more, become more productive, or find better jobs."

However, Stern and his associates argue that methodological problems with the evaluations may mask benefits of program participation. They conclude that even though positive economic outcomes are not shown, there is some indication that co-op students have higher quality jobs while in school than other high school students have.[13] This group of researchers argues that co-op placements provide students with positions of greater responsibility, better supervision, mentoring, and more opportunities to learn complex skills than what students receive when they get jobs on their own.[14]

Preliminary results from a longitudinal study (which does not correct the methodological problems) conducted by the same authors support the conclusion that the co-op jobs students hold while in school are of higher quality than jobs they find on their own.[15] Using data from one western state, Stevens[16] also found that co-op students who remained with the same employer after leaving school experienced higher earnings than non-co-op students who also remained with the same employers.

One reason offered for the lack of broadly positive economic returns to co-op education is the absence of any specific procedures for certifying skills learned in co-op. Instead of formal credentials, co-op programs rely on a variety of non-standard "soft" vocational credentials such as letters of recommendation from faculty.[17] Along the same lines, the GAO reported that participation by students (even in high-quality co-op programs) is not recognized widely as evidence of skill mastery.[18] Some of the high school coordinators contacted for the research indicated that student certification of industry-wide skill standards is one way to improve co-op's success. However, this conclusion remains speculative and would clearly depend on the kind and quality of skills students acquire in co-op programs.

**Youth Apprenticeships**

The newest and most ambitious of the formal work-based education models are the new youth apprenticeships. These apprenticeships are designed to provide a structured learning experience for high school students who are "too young and numerous to qualify for the small number of registered apprentice programs that exist in the U.S."[19] This new concept of youth apprenticeship includes preparation for postsecondary education as well as employment. Youth apprenticeships, typically designed for high school students who may go on to

postsecondary education, are different from traditional, registered apprenticeship programs, which are typically run by unions or trade associations, and which usually enroll young adults who have graduated from high school. Many traditional apprenticeship programs are found in the construction trades.

The apprenticeship model builds on European training systems that provide structured, non-university routes to careers through paid work and on-the-job training, combined with related classroom instruction. Each program has formal agreements registered with either state or federal apprenticeship agencies. The apprenticeship agencies award a certificate of completion at the end of the program.

States and localities have been experimenting with a variety of apprenticeship models and systems for a number of years. Although no particular approach appears to dominate, there is a growing consensus about the principles that should guide any youth apprenticeship and about the basic design elements that differentiate youth apprenticeships from other models linking school and work.[20] These principles include:

- Active participation of employers.
- Integration of work-based and school-based learning.
- Integration of academic and vocational learning.
- Structured linkages between secondary and postsecondary institutions.
- Award of a broadly recognized certificate of occupational skill.

Though gaining in popularity, youth apprenticeships are offered by relatively few secondary schools. One estimate places the proportion at less than 5 percent of schools.[21] In the Omnibus Survey, 11 percent of schools reported either tech-prep apprenticeship programs or other new apprenticeship programs. However, the inclusion of the term "tech-prep" in the question may have caused the estimate to be inflated. The survey found approximately 3,300 students in these programs.

In another recent study, conducted for the National Assessment, Finkelstein and Latting performed an extensive search to identify and document the prevalence of new youth apprenticeship programs.[22] Using a broad definition of youth apprenticeship, including programs that meet the above criteria, and some in the early stages of development, they found and collected data from 55 programs nationwide. On average, the programs they documented each served

approximately 60 students, though more than half (35) served 20 or fewer students. All told, the programs enrolled 3,412 students.

The authors indicate that their most significant finding is the high level of activity in developing programs. Developmental activities at both the state and federal level appear to have been a catalytic influence on the development of new programs as well as a stimulus for the refinement and expansion of existing programs. Finkelstein and Latting estimate that as many as 100 new programs will be started in the next three years, which will provide the capacity to double the number of student apprentice positions.

Youth apprenticeship programs are most often found in industries with labor shortages in technician-level occupations, such as hospitals, printing, and other manufacturing industries. They tend to develop in communities with a history of creative business practices. Many new programs have only some of the characteristics of youth apprenticeship as defined by the basic principles mentioned above, but are adding more.[23]

**Evaluation Results.** In general, youth apprentice programs are too new to have undergone systematic evaluation. Several states, including Arkansas, Georgia, Maine, Minnesota, Pennsylvania, and Wisconsin, have launched apprenticeship demonstration programs. Those programs will be evaluated, but few of them have been around long enough for a cohort of students to complete the high school years and then enter the labor market or the postsecondary component of the programs. So far, not enough data are available to judge the programs in terms of student outcomes or employer satisfaction.

Although program evaluation data were not collected, the Finkelstein and Latting study does contain information on the characteristics of apprentice programs as well as information about the students participating in them. Their major findings indicate the following:

- The majority of apprentice programs did not have stringent entrance requirements; rather, students with an interest in the programs were encouraged to participate.

- Racial and ethnic enrollments in the programs tended to reflect the population of the area.

- Participation in apprentice programs varied by gender. Female enrollments dominated teaching and child care programs, whereas male enrollments dominated manufacturing programs. In the fields of health care and graphic art, the genders were equally represented.

- The one-year completion rate (reported by 14 programs) was very high; with one exception all programs had a rate of 95 percent or better.

- Programs are generally run out of the school with other supporters playing advisory roles.

- The vast majority of programs do not have provisions for comprehensive outcome evaluations.

Although hard data are lacking, Finkelstein and Latting observe that "it is plausible to argue that youth apprenticeship programs have multiple benefits for participating students. Students who may not have been likely high school completers have competed and received their high school diploma. In addition, there has been career-based training and acculturation to the requirements of the workplace. This combination is consistent with what we know to provide greater likelihood of employment."[24] However, any conclusions about the effectiveness of youth apprenticeship programs must be based on more systematic evaluations.

**School-Based Enterprises**

The third and final type of work experience program reviewed here is school-based enterprises (SBE). In these programs, students produce goods or services for sale or use to other people. Such enterprises include school restaurants, construction projects, child care centers, auto repair shops, hair salons, and retail stores.[25] According to the Omnibus Survey, 23 percent of secondary schools have adopted some form of school-based enterprise. Similarly, a 1992 national survey of public secondary schools reports that 19 percent were sponsoring at least one SBE.[26]

These programs differ from co-ops and apprenticeships in that they do not place students with employers. Rather, the goal of school-based enterprises is to allow students to apply their classroom knowledge to running real-world businesses. Unlike the other work experience programs reviewed above, school-based enterprises are a viable option in communities where there are too few employers to provide sufficient jobs and training opportunities in the private sector.[27]

**Evaluation Results.** Many of the more popular school-based enterprises have been described in the literature, but there has not been any rigorous evaluation of the programs.[28] However, the anecdotal evidence regarding the programs is positive and does suggest that "learning academic and vocational skills through running a small business has been an exciting process for hundreds of young people."[29] Stern et al. in a recent review of 16 SBEs finds a wealth of anecdotal evidence, but no systematic evaluations, supporting economic gains from

participating in SBEs.[30] These authors also conclude that the benefits of time spent working on school-based enterprises compared with time spent in regular classroom activity still needs to be determined.

### Working Independently While in High School

Though the number of school-based programs that provide employment to students is growing, the vast majority of those who work while in school find employment on their own. Studies comparing the economic outcomes of students who work during high school with those of non-workers find that the high school workers have higher wages in the first years after leaving school than do non-workers.[31] Though all of these studies show positive effects for working while in school, none has controlled for selection bias. It may be that students who find employment in high school also have other "unobservable" traits that would lead to favorable economic outcomes. This issue of selection bias leaves the results open to question.

For those who do work, the number of hours they are employed is related to economic gains. Stern reports that students who work only a moderate number of hours per week perform better in school, earn more in jobs they obtain after graduating, and are more likely to enroll in postsecondary institutions after graduating, than those who do not work.[32] On the other hand, working more than 15–20 hours per week while in school may interfere with educational attainment and, in the long run, limit economic potential.

## WORK EXPERIENCE PROGRAMS FOR TWO-YEAR COLLEGE STUDENTS

Two-year colleges provide a variety of options in the delivery of job-related instruction. The range of work experience programs and the variety of linkages with employers and other non-university organizations is quite broad. This section reviews two of the more common programs — cooperative education and apprenticeships. School-based enterprises are primarily secondary programs. There are some in postsecondary institutions, but they are rare and there is little information on them.

### Co-op Programs

Cooperative education programs at the community college level follow the same form as high school programs. They award college credits as well as grades for both worksite learning and related instruction.

As at the secondary level, postsecondary co-op programs are the most widespread of the work experience programs. The Omnibus Survey found that 69 percent of public two-year postsecondary institutions have co-op programs serving some 81,000 students, or about 2 percent of all students at these

institutions. Recent estimates of the number of co-op programs range from Hirshberg's 437 to the Omnibus Survey's 673.[33]

**Evaluation Results.** The majority of evaluations of postsecondary co-op programs have examined programs in four-year institutions. Stern et al.[34] find that, as with high school programs, "evaluations of co-op programs in two-year colleges have been too sparse and too limited to permit any firm conclusions or generalizations."

Again, the anecdotal evidence from a variety of small studies on postsecondary co-op programs appears to be positive. Researchers have found that compared to non-co-op students at the same college, co-op students are more interested in their jobs, see a connection between their job and future (career) jobs, report more opportunities for learning at their jobs, and see the connection between school and work.[35] The effect of these connections on subsequent labor market outcomes is still unknown.

### Apprenticeship Programs

Two-year colleges are expected to play a significant role in the new youth apprenticeship initiative, especially through tech-prep programs. At present, postsecondary involvement with apprenticeship is principally with traditional registered apprenticeships. The American Association of Community and Junior Colleges (AACJC) estimates that 35 percent of two-year colleges provide the academic or general education portion of traditional apprenticeship programs.[36] The 1993 Followup Survey found that approximately 25 percent of public two-year postsecondary institutions participated in registered apprenticeship programs. The median enrollment in these programs was 48 students. Only 2 percent or 26 public two-year postsecondary institutions indicated the availability of new youth apprenticeship programs; almost half of these schools (48%) reported that no students were currently enrolled. From this information, it appears that very few students are being served by these programs at the postsecondary level.

As with youth apprenticeships in high schools, traditional apprenticeship programs in two-year colleges combine work-based experience with classroom instruction. A sponsor provides the job-specific training at the work site and the college provides the general training related to the craft or trade. Apprentices usually work on alternate cycles — several months on the job, several months in the classroom.

The majority of partnerships between two-year colleges and industry exist in the established trades (such as shipfitting, machining, pipefitting, and sheet metal working). Currently, the automotive industry is at the forefront of using two-year colleges for the educational needs of the industry. Such partnerships

have been most successful when the unions have been involved in a three-way association.

For college students the main benefits of completing an apprenticeship program include (a) certification leading to journeyman status from the sponsoring agency and the state, (b) an associate's degree in some field of applied science, and (c) a strong likelihood of employment.[37]

Employers also seem to benefit from the programs, for apprenticeships increase the supply of workers with improved communications skills and up-to-date technical skills. In addition, apprentice programs retrain displaced workers at a lower cost to the employer than if the training program were undertaken entirely by the company. [38]

**Evaluation Results.** As is the case for college-level co-op programs, no studies are available that evaluate the economic results of participating in these apprenticeship programs. The anecdotal evidence is positive, but sparse, and does not allow for generalizations to this category of programs as a whole.

## THE SCALE OF NEW WORK EXPERIENCE PROGRAMS

Although many policymakers and educators would like to see work-based programs expanded, they also agree that large-scale expansion appears to be a daunting prospect. To realize the goal of providing work-based programs for a significant portion of American youth would require an enormous increase in the number of available placements. There are over 5.1 million secondary students in grades 11 and 12. Co-op programs currently include somewhat over 400,000 students, around 7–8 percent of the total, and apprenticeship programs include several thousand. Hershey and Silverberg observe that to provide opportunities for 25 percent of students in grades 11 and 12 would require placements for more than three times the number currently in co-op programs.[39]

In a study of school-to-work/youth apprenticeship demonstrations for the Department of Labor, Corson and Siverberg found that local programs have difficulty recruiting businesses, and, because of competitive pressures and fluctuations in business cycles, in keeping those they recruit.[40] Moreover, local apprenticeship programs must often rely on a number of small employers, with each employer providing placement for only one or two students. The dispersion of students across multiple employers can complicate efforts to provide uniform and consistent training to all students in the program, particularly since individual employers and trainees must respond to changes in daily work demands. Implementation of structured training plans is difficult in these environments, and student training is more often ad hoc or on an as-needed basis.

## RECRUITING NEW EMPLOYERS

Finding employers to participate in work-based programs can be very difficult, as the programs require a substantial commitment of employer time and other resources. Understanding why those employers who choose to provide work-based experiences do so may in turn provide useful insights into the process of expanding work-based programs.

### Why Employers Participate

The National Center on the Educational Quality of the Workforce (EQW) surveyed 270 firms that participated in co-op or youth apprenticeship programs. Employers in the survey indicated two motives for participating in work experience programs: (a) to perform a community service and (b) to recruit new workers.[41] Bailey reports the same two motives.[42]

The EQW survey found that many employers were interested in contributing to improving school programs and to helping students acquire skills needed in the workplace; these same employers demonstrated a desire to give something back to the communities that supported their businesses. Though some of the smaller work experience programs may be able to exist on such goodwill, it is doubtful that a large-scale effort can be maintained on goodwill alone.

This study also reported that "firms interested in recruiting new entry-level workers indicated that these work-based programs are a 'good deal' for the employer."[43] For firms that consider students as potential employees, training costs become investments in the future of their own organizations. In addition, those firms trust participating schools to act as screening agents and to send them students who have the skills necessary to become productive workers. Obviously, firms are in business to make a profit. Thus, when work experience programs reduce the cost of finding and securing workers, employers have strong incentives to participate in them.

### Obstacles to Employer Participation

Two of the largest obstacles to recruiting additional employers are (a) the costs of training youth and incorporating them in the workplace, and (b) the view held by many employers that today's youth are poor-quality workers and that older, more experienced workers are both preferable and available. Each of these obstacles will be addressed in turn.

#### *Cost of Training Youth*

Regardless of benefits to firms, providing paid employment and structured workplace training is very costly. Costs include both wages for students and staff time for training and supervision. A recent study by the Manpower Demon-

stration Research Corporation (MDRC) found that even large firms were unlikely to provide a substantial number of positions for students in school-to-work programs, indicating that the costs of supervising and training students prohibited higher levels of participation.[44]

Reducing costs either through lower training wages or direct subsidies might encourage more employer participation, but government incentives for employers to hire young workers have not proven effective in the past.[45] In an evaluation of the Youth Entitlement Demonstration (run in the 1970s), a sample of employers in demonstration sites were asked about their willingness to take on high school students at a variety of reduced wages. Remarkably, fewer than 20 percent of employers indicated a willingness to take on these young people even at a wage of zero.[46] From that finding, another researcher concluded that "employers believed that these young people would not contribute enough to justify the effort needed to supervise them."[47]

Other studies also show that reducing the cost of training may not result in improved opportunities. Cappelli's study of British school-to-work transition policies indicated that providing economic incentives to employers to subsidize the costs of training can produce perverse and unexpected results.[48] Cappelli found that the British Youth Training Scheme (YTS) provided 16- and 17- year-olds with work-based training that resembled apprenticeship except that employers did not pay wages to the apprentices. Instead, the government provided them with a living allowance. In effect, the government rather than the employers paid the students.

Cappelli found that the popularity of YTS among young people depended in large part on the state of the labor market. During periods of labor shortage, YTS was not popular, as youth preferred regular employment over apprentice positions. When the labor market was slack, and jobs were hard to find, YTS positions were in great demand.

Cappelli also found that the goals of helping secure employment and increasing general skills were often in conflict. Employers benefited from YTS in having a low-cost system for screening, hiring, and using the labor of participating youth. However, young people often left the program as soon as they acquired marketable skills. Students in YTS firms were available to be hired by other firms, and attainment of credentials made these youth even more attractive. To prevent successful YTS apprentices from leaving, employers hired them before completion of their training.

Cappelli also reports that the nature of the subsidy to encourage training may in fact have acted as a deterrent. British firms were paid a subsidy before training began. In this situation, employers had no incentive to spend this money on improved training rather than to earn a profit from the labor of trainees. This

finding led Cappelli to conclude that after-the-fact rewards for youths who complete credentials would have been more effective.

*Other Costs of Participation*

In addition to the direct costs of hiring and supervising youth, employers sometimes encounter other less direct costs. Participation in work-based training by some firms is hindered by safety and liability rules that restrict young people under the age of 18 from the production floor or participation in certain tasks. For these firms, allowing youth under age 18 to work at their facility may cause insurance and workers' compensation costs to rise.[49]

Another cost associated with the lower training wages of apprentices comes from the reaction of older, more experienced workers. Legislated training wages run the risk of antagonizing older workers who are already concerned about job security. Many unions also oppose reduced training wages for fear that their workers will be replaced by "cheaper" laborers and that new youth apprenticeships will undermine established apprentice programs run by the unions.

*The Quality of Young Workers*

Another obstacle to increased employer participation in work-based programs is the negative view many employers hold regarding youth in general. In survey after survey, employers have expressed their dissatisfaction with the quality of entry level workers.[50] Osterman writes that "If apprentices are to be placed in an adult labor market on a large scale, employers must overcome their dislike or distrust of young employees."[51]

EQW conducted a series of focus groups with businesses in the same seven cities where the survey of firms participating in work experience programs had been conducted.[52] The focus group businesses did not participate in such programs. The focus groups all yielded the same conclusion: "Employers saw themselves as necessary participants but not necessarily as beneficiaries of the proposed expansion" of work experience programs. Many in the groups were almost hostile to the notion of employing high school students. This is particularly troublesome, as the communities chosen for the EQW study were perceived to have strong leaders and successful business-school partnerships; therefore, they were expected to look favorably on and be able to support expanding work experience programs.

According to these employers, fewer and fewer firms are looking to high school students as future permanent employees. In addition, high turnover rates among young workers greatly lower the chances that apprentices or trainees will continue as future employees — reducing the incentive for firms to participate in training. Furthermore, many participating firms report they do not foresee

enough job openings to hire all of their graduating apprentices. This last obstacle is likely to become an even greater issue if apprentice-type programs grow.

It may not be an exaggeration to say that this negative view of young workers is the greatest obstacle to successfully expanding work-based programs. While many innovative ways have been proposed to lessen the costs of training young people, **altering current attitudes toward hiring young people is a much more difficult and long-term task.**

In the current economic climate of streamlining and cost-cutting, when employers are faced with the choice of training high school youth or hiring more experienced older workers, most firms prefer the experienced workers. Although small businesses in the EQW focus groups were still hiring, they "... saw little need to engage in the extensive training of young people — not when there were so many older, more disciplined, better-skilled workers in search of jobs. None reported skill shortages; none indicated that they were having to pay premium wages to get the kind of workers they wanted."[53]

Based on their ongoing evaluation of 19 work experience programs supported by the Department of Labor, Hershey and Silverberg conclude that apprenticeships are likely to be considered only by employers in industries and occupations where short-term projections indicate a steady and growing demand for new and high-quality workers.[54] Under these conditions, where employers perceive the supervision, training, and wages of students as necessary to remaining competitive, incentives are great enough to force participation.

Chapter 7 in Volume II shows that employers in the EQW survey who were participating in youth apprenticeship or co-op programs had high opinions of them. These were a self-selected group of employers, many of whom were no doubt favorably inclined toward such programs from the start. Nevertheless, information from employers already involved in work-based programs may be useful in developing strategies to persuade other employers to participate.

### An Alternative Approach

For many employers, financial and other barriers may make work-based training programs infeasible. However, less formal and intensive options are available.

Hershey and Silverberg found examples of other models of indirect employer participation in preparing students for work. For some employers, involvement included providing limited work-site experiences. For others, it entailed making available employer resources, such as facilities and equipment, as well as teachers for classroom instruction. Still other employers advised on the design of curricula.

Along the same lines, MDRC, in its recent investigation of promising school-to-work programs reports that "expanding programs to serve a large proportion of high school students takes time and is dependent on a major commitment from employers. There is a trade-off between providing intensive work-based learning for relatively few students and expanding programs rapidly to serve large numbers of students with internships and other less intensive activities."[55]

## CONCLUSION

The past decade has seen a renewed interest, at both high school and postsecondary levels, in work experience programs as a means to ease the transition from school to work for youth who will not pursue four-year baccalaureate degrees.

For high school students, a variety of work experience programs, including co-op, new youth apprenticeships, and school-based enterprises, are available. These programs give students the opportunity to use skills acquired in the classroom in a workplace setting. Though evaluation data for these programs are largely unavailable, there is anecdotal evidence of positive effects on attitudes toward school and work.

Work experience programs are also available at the community college level, some of which are a direct extension of high school programs. Though not nearly as many postsecondary students participate in these programs, the anecdotal evidence about program effects is also positive.

Participating students and employers have generally favorable opinions of work experience programs, but there have been few systematic evaluations, and little is known about their effects on student employment outcomes.

The biggest difficulty in making work-based programs a major part of the education and training system is what has been called the problem of scale. At the secondary level, there are about 6 million students in grades 11 and 12, and finding positions in businesses to accommodate even one-fourth of them would require a mammoth effort. Co-op programs currently include about 400,000 students, youth apprenticeship programs, several thousand. It is proving difficult to recruit employers for youth apprenticeship programs, and to keep them, once recruited. Costs and negative employer opinions about the quality of young workers are major obstacles. More limited forms of employer involvement may be a more feasible means of expanding opportunities for students to participate in work experience efforts.

**The government should continue to explore ways to expand youth apprenticeships and other work experience programs. It should also explore more limited forms of work-based learning and employer involvement as a means of including larger numbers of students.**

**In particular, the possibility of relating jobs that students obtain on their own to work-related education in school should be explored. A similar approach could be taken with JTPA jobs in the summer youth programs.**

**At the same time, the government should conduct rigorous outcomes evaluations of existing work experience programs. The development of work experience programs should proceed in an evolutionary way, consistent with economic principles. The government should carefully assess the potential of these programs for expansion and evidence pertaining to their employment outcomes before considering any major commitment of resources to them.**

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# CHAPTER APPENDICES

# CHAPTER 1 APPENDIX

# Appendix 1-A

## Definition of Variables for the Regression Analysis of the Effects of Education Reform

In the analysis of factors related to integration and tech prep, the first explanatory variable (Perkins influence) is an item in the regular district questionnaire concerning district administrators' perceptions of Perkins influence on integration and a similar item for Perkins influence on tech prep.

The second explanatory variable (other national reforms) is a construct reflecting the mean scores of four highly intercorrelated survey variables (Pearson's $r > .5$, $p < .0001$): the perceived influence of 1) the report of the (Labor ) Secretary's Commission on Achieving Necessary Skills (SCANS); 2) the National Center on Education and the Economy report, *America's Choice: High Skills or Low Wages*; 3) the America 2000 initiative; and 4) the National Goals initiative. One score was developed for the influence of these initiatives on integration, another for their influence on tech prep.

The third variable (state support) is a construct reflecting the mean scores of two highly correlated survey variables: state support for integration (or tech prep) and state leadership in general. Again, one composite score was developed for integration, another for tech prep.

The fourth variable (academic reforms) is also a construct reflecting the mean scores of two highly correlated survey variables: increase in the proportion of academic credits needed to enter the state university system and increase in academic college credits needed for teacher certification(Pearson's $r = .44$, $p < .001$). The same variable is used in the integration and tech-prep equations.

The fifth variable (restructuring reforms) is a survey variable asking about the relaxation of state administrative rules for local districts. The same variable is used in both equations.

Fewer explanatory variables were available for the analysis of factors related to performance standards. They included state support for performance standards; academic reforms; restructuring reforms; and district size. The state support and academic reform variables in the performance standards equation were constructed in the same way as those for integration and tech prep.

# Appendix 1-B

## Description of Reform Measures Keyed to Table 1.6[1]

### Arkansas

1) Program participants receive both academic and vocational credentials.

2) State is implementing a three-to-four year 2+2 style academic/vocational program, beginning at the end of the 10th grade (State Acts 546, 533, and 10, of 1991). Program includes a combination of workplace learning and concurrent academic instruction. Implementation is currently in the demonstration stage.

3) Program participants will engage in one or two years of postsecondary classroom study following high school.

4) Formalized workplace exposure, in the form of apprenticeships, is a component of the policy. No details are available.

### California

1) High school restructuring is recommended, including altering the way in which academic basics are taught. Subjects would be taught in an integrated manner over a number of semesters rather than splitting each specific subject into separate courses.

2) Partnership academies currently exist in a number of high schools statewide. In these academies, a subset of the student body receives the high school curriculum in the context of a specific industry or field. The California Career Pathways for Youth model (Senate resolution #20, July 1993) is to expand the Partnership Academies.

3) The legislation includes the creation of a postsecondary credential, granted by community colleges, that certifies work-based competencies (exact level of current implementation is unknown, but limited).

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[1] From Premo & Levesque (1994).

4) It is recommended that assessments be performance-based rather than outcome-based. Standards in academic areas would be benchmarked, and, where possible, vocational standards would be set based on the standards of a relevant industry.

5) The academies provide one model of integrated education by providing a career-oriented context for academic and vocational education.

6) Students participating in the Career Pathways of Youth program will, after completing high school, continue on at a community college, culminating with a postsecondary technical credential. Throughout this process, participating students receive workplace experience. Not yet implemented.

7) In the existing academies, workplace exposure by participating students is a central aspect of the structure. Each academy is linked to one or more employers.

**Florida**

1) As a part of the state's "Blueprint 2000," all students are to be held to the same set of standards, regardless of their future plans. As in other states, these standards include SCANS competencies. This policy was initiated by the state Board of Education in 1992. Assessment procedures are yet to be formalized.

2) Students are to be assessed to determine that they have competency in the standards set by Blueprint 2000.

3) The state Board of Education is in the process of eliminating low-level courses and replacing them with applied courses that integrate academic learning in a workplace context.

4) Linkages between the high schools and the state's postsecondary institutions are being made to ensure that coursework taken at the high school level satisfies entrance requirements at the postsecondary level. An Articulation Coordination Committee exists to work out specific problems in this area.

5) The state's program also includes increasing internship, apprenticeship, and academy programs in participating schools (participation by schools is voluntary).

**Georgia**

1) Program participants will receive, in addition to a high school diploma, a state-issued certificate that enumerates the specific skills gained by the holder as a result of the apprenticeship experience.

2) Georgia House Bill 1931, enacted in 1992, provides for a formalized apprenticeship program targeted at youth in the 11th and 12th grades. Participants are required to complete a minimum of 144 classroom hours in coursework that is related to the work done at the apprenticeship sites.

3) A link between high school and postsecondary institutions will allow participants to smoothly continue classroom learning as their program progresses. Postsecondary institutions will issue technical certificates as noted above. Pilot projects will be established in fiscal years 1994 and 1995.

4) All program participants will complete a minimum of 2,000 hours of on-the-job training.

**Illinois**

1) Illinois uses the Tech Prep Associate Degree (2+2) model. Completing students, after two years of postsecondary education, are granted a TPAD from the postsecondary institution.

2) The state's 2+2 program emphasizes the combination of classroom learning and workplace experience. In the classroom, applied academics are used wherever possible.

3) Articulation agreements between secondary and postsecondary institutions are designed to ensure that participants smoothly progress from the first level to the second. Details of implementation are unknown.

4) Employers are consulted to ensure that educational standards and requirements are in line with workplace requirements. School/work partnerships also facilitate workplace exposure experiences for participants.

**Maine**

1) State policy includes offering a common academic background to all students through the end of the 10th grade. Overall policy was initiated in 1992, and pilot sites began implementing programs in the same year. Current level of implementation is limited.

2) Participating students explore different career and work options during the 9th and 10th grades.

3) Upon completion of the 12th grade, students will still receive a high school diploma. Upon completion of the program, at the end of the first postsecondary year, students receive a certificate of skill mastery.

4) Students are assessed at the end of the 10th grade. After demonstrating knowledge of the state's common core of learning, students are granted a certificate of initial mastery.

5) Beginning in the 11th grade, students split their time between worksite experience and related classroom instruction.

6) The program includes an articulation structure between high schools and the Technical Colleges. During the last year of the program, students spend 14 weeks taking classes at a Technical College. The balance of the year is spent at the workplace. The Southern Maine Technical College has established a Center for Youth Apprenticeship. The Center is charged with research and further policy development for the state.

7) Participating students spend 20 weeks at a workplace during the 11th grade, and 36 weeks in both the 12th grade and first postsecondary year.

**Maryland**

1) Elimination of the general track in the high schools was first proposed by the State Board of Education in 1991. It is unclear whether this has been adopted as policy.

2) The Apprenticeship Incentive Program is being created as a result of legislation that went into effect in October 1993. One aspect of this program is the use of instructional programs, both in the classroom and the worksite, that are competency-based. The use of competency-based programs implies that assessments will be required to gauge participants' competencies.

3) Articulation agreements between high schools and postsecondary institutions will also be forged. This will allow participants to move smoothly through a 2+2-style program.

4) Partnerships will be made between educational institutions and employers to facilitate work-based learning and the school-to-work transition.

As is the case in New Jersey, the state will be offering funding to consortia of educational institutions and employers to create industry-specific school-to-work programs. Implementation has yet to begin.

**Michigan**

1/2) Elimination of the general track in high school is recommended. Since students must choose from the remaining two options it will be necessary that they consider their future objectives during high school.

3) A statewide periodic student evaluation system is advocated for all students participating in the state's proposed 2+2 program. This will assess the performance and later outcomes of participants as they complete high school and postsecondary programs.

4) All community colleges are encouraged to enter into 2+2 tech-prep partnerships with local high schools.

5) The creation of a tech-prep advisory committee is recommended. This body would assess the needs of the state economy, and would assure that tech-prep programs are addressing those needs. The body would include state business and industry representation.

**Minnesota**

1) A common set of education goals is being formulated. These goals will create a common set of graduation requirements. SCANS-type competencies are included in these proposed graduation rules.

2) Career exploration, including exposure to different occupations during junior high and early high school years, is an aspect of the Comprehensive Youth Apprenticeship Program. Pilot sites are currently being selected.

3) Secondary and postsecondary instruction are to be integrated (2+2-style), and will be accompanied by work-based learning experiences.

4) Representatives of business, industry, and organized labor are to be involved in the planning and implementation process. Also, work-based learning, at the secondary and postsecondary levels, is to be a formalized aspect of the program, once it is up and running.

**New Jersey**

1/3) Establishment of the Youth Transition to Work Partnership, codified in June 1993. Linkages between schools, employers, and labor organizations will be created to facilitate school-to-work education structures. These

programs would include concurrent classroom instruction—at the secondary and postsecondary levels—and workplace experience.

2) Linkages between secondary and postsecondary educational institutions will also be forged. These will result in articulated pathways for participating students to follow.

In both of these cases, state involvement will be limited to providing funds for the creation and operation of individual partnerships. Interested consortia of employers and educational institutions will apply for funding from the state. As the legislation (Assembly Bill A. 2616) passed last June, implementation has not yet occurred.

**New York**

1) New York's wide-ranging policy recommendations came as a result of work done in 1992 by the Task Force on Creating Career Pathways for New York State Youth, established by Governor Cuomo. One purpose of the recommendations is to create common educational standards for all students in the first two years of high school. These standards are to include those skills and knowledge that all students will need to excel in further education and work experiences. These standards are to be benchmarked to world standards, and will include SCANS competencies.

2) After successfully mastering the common standards, students will begin to focus their education on a particular industry. As is the case in Washington state, this method uses the knowledge required to work in an industry as a tool around which curriculum can be organized. Worksite exposure for all students will also be a component of the industry focus.

3) The general track of study in the high schools should be eliminated. Students will be required to consider career options and this will affect their curricula choices.

4) Once a student has demonstrated mastery of the common standards, the student will be awarded a Career Pathways Certificate (at the end of the 10th grade). After earning the CPC, students continue with their high school education. The high school diploma will still be granted to completers at the end of the 12th grade. Professional Technical Certificates will be granted to those students who successfully complete a 2+2 program.

5) Before students are granted the CPC, they will be required to demonstrate mastery of the common standards. This will be accomplished by the use of portfolios and other alternative assessment tools.

6) Workplace skills and experiences should be integrated into the general educational scheme at all levels.

7) The 2+2 programs advocated, and the Professional Technical Certificates that would be granted to postsecondary completers, will require articulation agreements between the secondary and postsecondary levels. Community colleges will play a central role in the operation of these proposed programs, as they do with tech-prep programs.

8) As a general rule, it is advocated that the business and education communities communicate and interact more at all levels.

**Ohio**

1) The state is in the process of assembling the components of a school-to-work transition program. Specific recommendations include the use of performance-based assessment methods to insure that completers have mastered the skills imparted by the program.

2) The business community should be involved in both the planning and the implementation of the program. The business community should be consulted to insure that the program addresses the needs of employers. Employers will also be called upon to offer workplace learning experiences to program participants.

While specifics concerning proposed school-to-work programs in the state are sparse, in 1993 funding was appropriated to begin the training of mentors and the creation of pilot school-to-work demonstration sites.

**Oklahoma**

1) One stated aspect of the planned program is that it must result in a method of certifying the workplace skills that program completers have mastered.

2/4) State policy requires that vocational or apprenticeship programs combine classroom instruction with worksite training. Policy was enacted in May 1993. Details of implementation and current level of implementation are unknown at this time.

3) Program must bridge the gap between secondary and postsecondary institutions, to allow for smooth transitions between the two. No other program specifics were included in the legislation.

**Oregon**

1) All students are to be exposed to a common curriculum framework, up through the end of the 10th grade. The goals of the framework are to include SCANS-style competencies, along with more specific academic objectives. This framework, along with the performance standards that will accompany them, is currently being formulated at the state level. Local districts are to have considerable authority concerning the specifics of implementation.

2) At completion of the 10th grade, all students are to choose from a variety of areas of specialization, around which they plan their coursetaking and workplace experiences. Currently, the state has six pilot schools that have been restructured. Each school currently offers one or more industry-based focus areas. The number of focal areas offered by each school is to be expanded over time. Additionally, students are to be free to transfer to a school that offers a focal area of interest. Other schools are to apply for state restructuring grants, to facilitate adoption of this format. Eventually, all students in the state are to have access to all six areas of focus, be it at their high school or another nearby high school.

3) Students will be choosing a focal area around which their last two years of high school will be structured. During the common foundation period exploration of different career fields will be emphasized. Details of how this will be done, as well as the current level of implementation, are unclear.

4) Upon successful completion of the common foundation period, students will be awarded the Certificate of Initial Mastery (CIM). Upon successful completion of the specialization period, the Certificate of Advanced Mastery (CAM) will be awarded. At the postsecondary level, 2+2-style programs exist in 18 secondary-postsecondary consortia statewide, using Perkins funding. Completers of these programs are awarded a Tech Prep Associate Degree.

5) Assessment before granting the CIM is to include performance-based assessments and portfolios. Currently, seven elementary and high schools in the state are working to create these assessments and performance benchmarks. At the CAM level, "Performance standards and assessment procedures will be developed in the next few years." (Oregon State Department of Education, 1993). Regular assessments to gauge progress through grades K–10 are also being developed (no implementation yet).

6) At pilot sites, students' coursework is structured around the focal area chosen. Academic classroom learning will be accompanied by hands-on

experience in a workplace environment. Again, implementation is currently limited to six pilot sites.

7) Eighteen Tech Prep Associates Degree (TPAD) consortia include involvement by the community colleges in the second half of the 2+2 programs.

8) During the specialization period, at the six pilot schools students are to receive workplace training in addition to classroom instruction. The exact amount of exposure, as well as the amount of exposure as a function of students' future plans (immediate work, going to a university, etc.), is unclear. At the postsecondary level, the 18 TPAD consortia offer formalized apprenticeship-style workplace experiences.

**South Carolina**

1) Currently, policy is limited to the creation of a state council. This council's objective is to address the possibility of creating statewide school-to-work and apprenticeship programs. One requirement of any policies considered is that they address the needs of students who are not planning to attend a four-year postsecondary institution, and may be at risk of dropping out of school.

This council was created as a result of legislation passed in 1992. Legislation pending in 1994 includes H.B. 3948, which would establish apprenticeship programs statewide. Specifics of this pending bill are unknown.

**Tennessee**

1) Through the end of the 10th grade, all students are enrolled in the same types of classes. After completing this common foundation, students branch off into more specialized study. A number of pilot schools are implementing these reforms.

2) After completion of the 10th grade, all students will choose from an academic (university-bound) or vocational track. Specific specializations are not know.

3) A program exists to orient high school students to the world of work before graduation. This program focuses on career planning and an introduction to the work marketplace — learning how to get a job. This program is being used in 59 of the state's 95 counties.

4) The use of alternative assessments, including portfolios, is currently being introduced to teachers for use throughout the state. By 1995, all students

will be required to take a standardized test—the SAT or ACT, or Work Keys test—in order to graduate.

5) Applied courses, such as Math for Technology, are being employed at the pilot sites, integrating academic and vocational learning.

6) All school districts in the state have vocational advisory committees, with business and industry representation, to help guide vocational education and workplace exposure opportunities. Eighty percent of the state's high schools currently have some sort of school-business or school-community partnerships.

**Texas**

1) The Career Pathways Program for Youth was established as a result of legislation passed in 1993. The program will take students through a learning process that integrates school and work through high school and beyond. Program specifics will be finalized by a Design Committee by 1995.

2) Dialogue between secondary and postsecondary educational institutions will result in articulation agreements to facilitate smooth transitions of participants between the secondary and postsecondary components of the future 2+2 program.

3) The Career Pathways Program will draw upon members of the business community for guidance in the creation of the 2+2 program and to make available worksite training opportunities for program participants. Additionally, as a result of earlier legislation (in 1989), the state has been split up into 24 Quality Workforce Planning Regions. Within each region, school-to-work efforts are monitored by a committee to ensure that they are in line with local economic and labor market demands. Each committee includes local business representation.

   As the Career Pathways Program was codified last summer, current implementation is limited. Further details are unknown.

**Vermont**

1) Vermont's Common Core of Learning standardizes academic and personal growth goals that students must master before continuing their education (not yet implemented).

2) Wherever possible, student evaluations are to be performance-based. In addition, career portfolios will be used to document school and workplace

performance. These portfolios will be used for work placement purposes and for instructional assessments.

3) Programs that integrate the academic and vocational curricula will be developed. The goal of this curricula is to prepare all students for a variety of options (postsecondary education, immediate work, or technical education).

4) The system will include opportunities for students to move on to postsecondary study after completion of high school-based school/workplace education. Details were not given.

5) The business community will be involved in both the planning and the operation of the school-to-work opportunities system.

Overall, implementation of pilot projects is partly a function of the state receiving federal funds under the School-to-Work Opportunities Act.

**Washington**

1) Currently two pilot schools offer a range of industry-specific specializations for all students to choose from. Curricula are structured around these specializations — subjects are taught in the context of the specializations. All students, regardless of their future plans, participate. The specific mix of courses is adjusted as a function of each student's future plans.

2/5) HB 2359 (1992) codified the integration of academic and vocational education. There are currently 35 high schools with grants to create integrated curricula emphasizing increased academic, vocational, and personal guidance, and including the participation of employers, parents, and community members. Active involvement of teachers in the planning process, as well as provision of inservice training, is also required.

3) A certificate of mastery of academic and personal basic competencies, to be granted around the end of the 10th grade, is included in the policy (not yet implemented).

4) New methods of assessing student performance throughout the secondary grades are to be created.

6) Local school districts are free to create new, integrated courses, and the state's Higher Education Coordinating Board will certify them for satisfying college entrance requirements, provided that the courses satisfy requirements defined by the Board.

7) Partnerships are to be made with businesses and employers to incorporate worksite learning with classroom instruction. Degree of implementation is unknown.

**Wisconsin**

1) The academic basics will be standardized for all students, regardless of their future plans, and be "...benchmarked to the highest in the world" (Wisconsin Governor's Office, 1991). This will be reflected in *Wisconsin's Educational Goals*, and *Wisconsin's Learner Outcomes*, which identify what all students are expected to learn. These include SCANS-style general skills and citizenship skills. Not yet implemented.

2) A career major structure, as in Oregon and Washington, is proposed, but not yet adopted as policy.

3) The use of a certificate of initial mastery is advocated. Whether it is policy or not is unclear. At the postsecondary level, completers of a 2+2 program are to receive a state-based certificate that lists their academic and occupational abilities. Overall program standards are currently being developed.

4) State policy includes the creation of the "10th Grade Gateway Assessment." Students will have their skills and competencies assessed at the end of the 10th grade, using performance assessments and portfolios. Upon successful completion, students will be able to move on to more specialized study. Additionally, regular assessments, at the 4th, 8th, and 10th grades, will be used to monitor learning progress (not yet implemented).

5) A formalized structure is to be created that will allow high school students in the 10th and 11th grades to enroll in technical college courses and receive credit from both the high school and the technical college (not yet implemented).

6) Workplace exposure in the high school and postsecondary years is state policy; however, the current level of implementation is unclear.

# Appendix 1-C

## The National Skill Standards Project

Grants awarded to develop skill standards in:

Agriscience/Biotechnology
Air Conditioning, Refrigeration, & Power
Automotive, Autobody, & Truck Technicians
Biotechnical Sciences
Chemical Process Industries
Computer Aided Drafting
Electronics (2 projects)
Electrical Construction
Food Marketing Industry (supermarket)
Forest/Wood Products
Hazardous Materials Management Technicians
Health Science and Technology
Heavy Highway/Utility Construction
Human Services Occupations
Industrial Launderers
Metalworking
Photonics Technicians
Printing
Retail Trade
Tourism, Travel, and Hospitality
Welding Occupations

# CHAPTER 2 APPENDIX

## Table A-2.1
## Measures and Standards Implemented by States at the Secondary Level as of Fall 1992

| | Basic & Advanced Academic Skills | Occupational Competency Gain | Occupational Competency Attainment | Job or Work Skills Attainment | Retention / Completion | Placement | Other(s) |
|---|---|---|---|---|---|---|---|
| Alabama | ✔ | ✔ | | | ✔ | ✔ | ✔ |
| Alaska | ✔ | * | | | | | ✔ |
| Arizona | ✔ | | ✔ | | ✔ | ✔ | |
| Arkansas | * | | * | * | * | ✔ | ✔ |
| California | ✔ | | ✔ | * | ✔ | * | |
| Colorado | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Connecticut | ✔ | | | ✔ | | ✔ | ✔ |
| Delaware | ✔ | | | * | ✔ | | |
| Florida | ✔ | | | | | ✔ | ✔ |
| Georgia | ✔ | | ✔ | * | | ✔ | ✔ |
| Hawaii | ✔ | | ✔ | ✔ | ✔ | ✔ | |
| Idaho | ✔ | | ✔ | | | ✔ | ✔ |
| Illinois | ✔ | | * | * | ✔ | ✔ | ✔ |
| Indiana | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Iowa | ✔ | | ✔ | | | ✔ | ✔ |
| Kansas | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Kentucky | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Louisiana | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Maine | ✔ | | ✔ | ✔ | ✔ | ✔ | |
| Maryland | ✔ | | ✔ | | | ✔ | ✔ |
| Massachusetts | ✔ | | * | | ✔ | ✔ | ✔ |
| Michigan | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Minnesota | ✔ | | | | | | ✔ |
| Mississippi | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Missouri | | | ✔ | ✔ | | | ✔ |
| Montana | ✔ | | ✔ | | ✔ | ✔ | |
| Nebraska | ✔ | * | * | * | * | ✔ | ✔ |
| Nevada | ✔ | ✔ | ✔ | | ✔ | ✔ | |
| New Hampshire | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| New Jersey | ✔ | * | ✔ | | ✔ | ✔ | ✔ |

*(continued)*

**Table A-2.1 (continued)**
**Measures and Standards Implemented by States at the Secondary Level as of Fall 1992**

| | Basic & Advanced Academic Skills | Occupational Competency Gain | Occupational Competency Attainment | Job or Work Skills Attainment | Retention/ Completion | Placement | Other(s) |
|---|---|---|---|---|---|---|---|
| New Mexico | ✓ | | | | | ✓ | ✓ |
| New York | ✓ | | ✓ | | ✓ | | ✓ |
| North Carolina | * | ✓ | | ✓ | | ✓ | ✓ |
| North Dakota | ✓ | | ✓ | | | ✓ | |
| Ohio | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Oklahoma | ✓ | | ✓ | | ✓ | ✓ | |
| Oregon | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Pennsylvania | ✓ | ✓ | ✓ | | | ✓ | |
| Rhode Island | ✓ | | ✓ | | ✓ | ✓ | |
| South Carolina | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| South Dakota | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Tennessee | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Texas | ✓ | | ✓ | | * | ✓ | ✓ |
| Utah | ✓ | * | ✓ | * | | ✓ | |
| Vermont | ✓ | | ✓ | ✓ | | ✓ | |
| Virginia | ✓ | | ✓ | | | | ✓ |
| Washington | ✓ | | ✓ | ✓ | | ✓ | |
| West Virginia | ✓ | | ✓ | | | ✓ | ✓ |
| Wisconsin | ✓ | | | | ✓ | ✓ | ✓ |
| Wyoming | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Washington, D.C. | ✓ | ✓ | ✓ | | | | |

*Phasing in measures and standards after 1992–93.

Source: Rahn, Hoachlander, & Levesque (1992)

## Table A-2.2
## Measures and Standards Implemented by States at the Postsecondary Level as of Fall 1992

| | Basic & Advanced Academic Skills | Occupational Competency Gain | Occupational Competency Attainment | Job or Work Skills Attainment | Retention/ Completion | Placement | Other(s) |
|---|---|---|---|---|---|---|---|
| Alabama | ✔ | | | | ✔ | | ✔ |
| Alaska | ✔ | | | | | ✔ | ✔ |
| Arizona | ✔ | | ✔ | | | ✔ | ✔ |
| Arkansas | ✔ | * | ✔ | | ✔ | ✔ | |
| California | ✔ | * | | | ✔ | ✔ | |
| Colorado | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Connecticut | ✔ | | | ✔ | | ✔ | ✔ |
| Delaware | ✔ | | | * | ✔ | | |
| Florida | ✔ | | | | ✔ | ✔ | ✔ |
| Georgia | ✔ | | ✔ | ✔ | ✔ | | ✔ |
| Hawaii | ✔ | | ✔ | | ✔ | ✔ | |
| Idaho | ✔ | | ✔ | | | ✔ | ✔ |
| Illinois | ✔ | | * | * | ✔ | ✔ | ✔ |
| Indiana | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Iowa | ✔ | | ✔ | | | ✔ | ✔ |
| Kansas | ✔ | | ✔ | ✔ | | ✔ | ✔ |
| Kentucky | ✔ | | ✔ | | * | ✔ | ✔ |
| Louisiana | ✔ | | ✔ | ✔ | ✔ | ✔ | |
| Maine | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Maryland | ✔ | | ✔ | ✔ | | ✔ | ✔ |
| Massachusetts | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Michigan | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Minnesota | * | | * | | ✔ | ✔ | ✔ |
| Mississippi | ✔ | | ✔ | | ✔ | | ✔ |
| Missouri | ✔ | | ✔ | ✔ | | ✔ | ✔ |
| Montana | ✔ | | ✔ | | ✔ | ✔ | |
| Nebraska | ✔ | | * | * | * | ✔ | ✔ |
| Nevada | ✔ | | ✔ | | * | ✔ | |
| New Hampshire | ✔ | | * | | ✔ | * | ✔ |
| New Jersey | ✔ | * | ✔ | | * | ✔ | ✔ |

*(continued)*

**Table A-2.2 (continued)**
**Measures and Standards Implemented by States at the Postsecondary Level as of Fall 1992**

| | Basic & Advanced Academic Skills | Occupational Competency Gain | Occupational Competency Attainment | Job or Work Skills Attainment | Retention / Completion | Placement | Other(s) |
|---|---|---|---|---|---|---|---|
| New Mexico | ✔ | | ✔ | | | * | ✔ |
| New York | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| North Carolina | ✔ | | | | ✔ | | ✔ |
| North Dakota | | | ✔ | | | ✔ | |
| Ohio | ✔ | | ✔ | | | ✔ | ✔ |
| Oklahoma | ✔ | | ✔ | | | ✔ | |
| Oregon | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Pennsylvania | ✔ | ✔ | ✔ | | | ✔ | |
| Rhode Island | ✔ | | ✔ | | ✔ | ✔ | |
| South Carolina | ✔ | ✔ | ✔ | | ✔ | ✔ | |
| South Dakota | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Tennessee | ✔ | | | | * | ✔ | ✔ |
| Texas | ✔ | | ✔ | | ✔ | ✔ | ✔ |
| Utah | ✔ | * | ✔ | * | | | |
| Vermont | ✔ | | ✔ | | ✔ | ✔ | |
| Virginia | ✔ | | ✔ | | | ✔ | |
| Washington | ✔ | | ✔ | ✔ | | ✔ | ✔ |
| West Virginia | ✔ | | ✔ | | ✔ | | ✔ |
| Wisconsin | ✔ | | | | ✔ | ✔ | ✔ |
| Wyoming | ✔ | | ✔ | ✔ | | ✔ | ✔ |
| Washington, D.C. | | ✔ | ✔ | | | ✔ | |

*Phasing in measures and standards after 1992–93.

Source: Rahn, Hoachlander, & Levesque (1992)

**Table A-2.3**
**Number of States that Have Taken Various Steps in Developing an Accountability System, 1993**

| | Secondary | | | Postsecondary | | |
|---|---|---|---|---|---|---|
| | Yes | No | In Process | Yes | No | In Process |
| Acquiring measures: | | | | | | |
| Selected from among existing measures | 40 | 9 | 2 | 39 | 10 | 1 |
| Developed new measures | 44 | 4 | 3 | 44 | 4 | 2 |
| Assessed the quality of measures chosen | 24 | 12 | 15 | 24 | 13 | 13 |
| Involved local program administrators in choosing measures | 49 | 1 | 1 | 47 | 2 | 1 |
| Setting standards: | | | | | | |
| Examined existing data to determine performance level | 40 | 8 | 3 | 32 | 10 | 8 |
| Established performance standards | 46 | 1 | 4 | 39 | 3 | 8 |
| Utilized business/industry standards | 22 | 23 | 6 | 15 | 23 | 12 |
| Using results: | | | | | | |
| Assessed student performance using standards | 18 | 7 | 26 | 17 | 7 | 26 |
| Evaluated vocational programs using standards | 20 | 3 | 28 | 18 | 3 | 29 |
| Modified programs based on evaluation of results | 11 | 14 | 26 | 14 | 16 | 20 |
| Assessed access of special populations to high-quality vocational programs | 16 | 9 | 26 | 14 | 12 | 24 |
| Assessed vocational education in "all aspects of the industry" | 7 | 19 | 25 | 7 | 20 | 23 |

Source: 1993 Followup Surveys of State Agencies

## Table A-2.4
## Summary of Assessment Instruments and Measurement Tools Used to Measure Academic Skills in Secondary Vocational Education

**Alabama**: Alabama Graduation Exam
**Alaska**: Local agency chooses instrument or portfolio
**Arizona**: Local agency chooses instrument
**Arkansas**: Pre-/post-CORD materials (advanced/basic)
**California**: High School Performance Test
**Colorado**: Local agency chooses instrument (competencies - SCANS)
**Connecticut**: *Basic* - CT Academic Performance Test; *Advanced* - portfolio
**Delaware**: Profile eighth to tenth (writing, math, science)
**Florida**: High School Completion Test (HSCT)
**Georgia**: Test of Achievement & Proficiency (TAP) or scores in math and English courses using locally chosen assessments or completion of a grade level
**Hawaii**: State-mandated HSTEC (senior year)
**Idaho**: Completion of C-core graduation requirements; Direct Writing Assessment; TAP; ITBS
**Illinois**: IGAP (math, reading)
**Indiana**: Local agency chooses instrument (math, English)
**Iowa**: Local agency identifies or develops instrument
**Kansas**: KS State Assessment Instrument (math) or a norm-referenced test such as Iowa Test of Education Development or Stanford Achievement Test (phasing in English and composition)
**Kentucky**: Individual student assessment results from Kentucky Instruction Results Information System (KRIS) or student portfolio (twelfth grade)
**Louisiana**: Louisiana Education Assessment Program (LEAP) (math, English/language arts, composition, science, and social studies) or completion of a sequence of courses
**Maine**: Test of Adult Basic Education (TABE)
**Maryland**: *Basic* - Maryland Functional Test (eleventh grade); *Advanced* - selection of criterion-referenced tests not finalized (mathematics, reading, writing/language usage, social studies, and science)
**Massachusetts**: Phasing in during 1993-1994
**Michigan**: MEAP (math, reading, science in tenth and eleventh grades with post-test in twelfth grade)
**Minnesota**: Complete graduation requirement
**Mississippi**: Completing academic courses or showing gain through a norm-referenced pre-test/post-test series (locally chosen)
**Missouri**: Missouri Mastery and Achievement Test (MMAT) (math, English/communications, science, and social studies/science; tenth to twelfth grade gain)
**Montana**: Local agency chooses instrument (pre- and post-assessments with either standardized assessment instrument(s) or teacher/faculty-developed locally referenced test
**Nebraska**: Local agency chooses instrument (math - 1993, communication-1994, science-1995)
**Nevada**: *Basic* - Nevada High School Proficiency Exam (NHSPE) (eleventh grade); *Advanced* - course completion
**New Hampshire**: Local agency chooses instrument (pre-/post-test of math and language arts)
**New Jersey**: *Basic* - Eighth grade Early Warning Test and VTECS academic item banks; *Advanced* - HSPT
**New Mexico**: *Basic* - ITBS (eighth grade) and New Mexico Competency Exam (tenth grade); *Advanced* - course completion
**New York**: Course completion/Regents' Exam
**North Carolina**: Functional Literacy Test (eighth grade) and a post-test to be developed
**North Dakota**: California Test of Basic Skills (CTBS) twelfth compared with eighth grade
**Ohio**: *Basic* - Ninth grade proficiency test; *Advanced* - academic skills portion of the vocational competency tests offered by the Vocational Instructional Materials Laboratory at Ohio State University (OSU) or an alternative standardized test
**Oklahoma**: Pre-/post-test to be developed and administered by local programs upon ODVTE guidelines
**Oregon**: Course completion
**Pennsylvania**: *Basic* - Pennsylvania System of School Assessment (PSSA) (reading and math) sampling of eleventh and twelfth grades; *Advanced* - complete three or more advanced academic courses in math, science, and communications, including applied academics.
**Rhode Island**: *Basic* - Metropolitan Achievement Test (MAT) grades eight, ten, and twelve (reading, math, and language arts); *Advanced* - MAT (reading comprehension and problem solving)
**South Carolina**: Stanford 8 "3R's Battery" (Ninth to eleventh grade)
**South Dakota**: Stanford Achievement Tests in total reading, total math, and science (eighth or eleventh grade)
**Tennessee**: ACT/Work Keys
**Texas**: TAAS test
**Utah**: Stanford Achievement Test, Advanced I, Form J (eighth grade), and TASK III, Form I (eleventh grade) for math, reading, and language arts/English
**Vermont**: Test of Adult Basic Education (TABE) (reading, language arts, and math)
**Virginia**: Iowa Test of Basic Skills (ITBS) (eleventh grade in math, reading, and communications); possibly a reliable criterion-referenced assessment instrument will be selected by 1994 as an alternative
**Washington**: Local agency chooses instrument (state-level competencies)
**West Virginia**: Comprehensive Tests of Basic Skills (CTBS) (pre-and post-test of reading/language arts, and math)
**Wisconsin**: Completion of a sequence of courses
**Wyoming**: Local agency chooses instrument (math, reading, and language arts and/or science)

Source: Rahn, Hoachlander, & Levesque (1992)



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## Table A-2.5
## Summary of Assessment Instruments and Measurement Tools Used to Measure Academic Skills in Postsecondary Vocational Education

**Alabama**: ACT-ASSET
**Alaska**: Local agency chooses instrument or portfolio
**Arizona**: Local agency chooses instrument
**Arkansas**: *Remedial* - TABE or ABLE; *Advanced* - course completion of applied academics
**California**: Course completion
**Colorado**: Local agency chooses instrument (competencies - SCANS)
**Connecticut**: *Basic* - passing a developmental course; *Advanced* - passing general education course
**Delaware**: Complete academic requirements (writing, math, science)
**Florida**: College Level Academic Skills Test (CLAST) Basic Skills Test
**Georgia**: TAPPS or equivalent instrument
**Hawaii**: *Basic* - remedial/developmental course completion; *Advanced* - general education course completion
**Idaho**: GPA; course completion; ASSET or TABE
**Illinois**: Local agency chooses instrument (math, reading); course completion
**Indiana**: Local agency chooses instrument (math, English)
**Iowa**: Local agency identifies or develops instrument (pre-tests/post-tests, a student profile, a longitudinal study)
**Kansas**: Remedial course with locally chosen pre-test/post-test such as ACT, ASSET, CAPS, MAS, SAT
**Kentucky**: *Basic* - 2.0 GPA in remedial/developmental courses; *Advanced* - 2.0 in academic courses above the remedial/developmental level
**Louisiana**: *Technical Institutes* - Test of Adult Basic Education (TABE) (math, reading, English) *or* completion of a sequence of courses; *Higher Education* - choice of instrument such as the Collegiate Assessment of Academic Proficiency (CAAP), Writing Skills Test, the CAP Mathematics Skills Test, the College Level Examination Program (CLEP), College Composition with Essay, CLEP College Algebra, Tech-prep participation, the ACT scores, etc.; *Tech Prep* - Louisiana Education Assessment Program (LEAP) (math, English/language arts, composition, science, and social studies) *or* completion of a sequence of courses
**Maine**: Test of Adult Basic Education (TABE)
**Maryland**: Measuring only occupational skills
**Massachusetts**: Phasing in during 1993-1994
**Michigan**: Course completion
**Minnesota**: Pre-/post-test to be phased in during 1995
**Mississippi**: Completing academic courses *or* showing gain through a norm-referenced pre-test/post-test series (locally chosen)
**Missouri**: Institutionally identified and Department-approved academic assessment (beginning to completion)
**Montana**: Local agency chooses instrument (pre- and post-assessments with either standardized assessment instrument(s) or teacher/faculty-developed locally referenced test
**Nebraska**: Local agency chooses instrument (math-1993, communications-1994, science-1995)
**Nevada**: Completion of basic and advanced courses
**New Hampshire**: Existing instruments (math, reading, and writing) in 1992; in 1993, ACT Asset
**New Jersey**: *Basic Collegiate* - NJCBST; *Basic Noncollegiate* - HSPT or TABE; *Advanced* - enrollment in advanced courses
**New Mexico**: *Basic* - completion of developmental courses; *Advanced* - passing certification and licensure exams
**New York**: No plans to measure at this time
**North Carolina**: Required credit hours, completion of a sequence, passing remedial course, passing general education and related courses
**North Dakota**: California Test of Basic Skills (CTBS) twelfth compared with eighth grade
**Ohio**: *Basic* - completion of basic skills courses; *Advanced* - completion of English/communication courses; *Adult Education: Basic* - remedial instruction such as ABE or other remedial academic classes; *Advanced* - academic skills portion of the vocational competency tests offered by the Vocational Instructional Materials Laboratory at Ohio State University (OSU) or an alternative standardized test
**Oklahoma**: Pre-/post-test to be developed and administered by local programs upon ODVTE guidelines
**Oregon**: Course completion
**Pennsylvania**: Grade point average of at least 2.0 in academic courses
**Rhode Island**: Course completion
**South Carolina**: Course completion; decrease in tech-prep students enrolling in developmental/remedial courses
**South Dakota**: Local agency chooses achievement test
**Tennessee**: Locally chosen, state-approved standardized test of general education
**Texas**: Course or program completion
**Utah**: Course completion
**Vermont**: Course completion and student survey
**Virginia**: Locally chosen assessment or course completion
**Washington**: Course completion
**West Virginia**: Course completion
**Wisconsin**: Local agency chooses instrument (pre-/post-test of math, reading, writing, and ESL) and course completion
**Wyoming**: Local agency chooses instrument (SCANS)

Source: Rahn, Hoachlander, & Levesque (1992)

## Table A-2.6
## Summary of Assessment Instruments and Measurement Tools Used to Measure Occupational Skills in Secondary Vocational Education

**Alabama**: Statewide tests to be developed; currently local tests approved by SDE
**Alaska**: Phase in during 1995
**Arizona**: Local agency identifies competencies and instrument (may use state-validated competencies)
**Arkansas**: VTECS
**California**: State Career Technical Certification Assessments to be developed
**Colorado***: Local agency chooses instrument (competencies - SCANS)
**Connecticut****: Portfolio
**Delaware**: Phased in during 1995 (competencies - SCANS)
**Florida**: No plans to measure at this time
**Georgia***: Competency checklist (currently developing assessment instrument)
**Hawaii***: Course completion
**Idaho**: Occupational competency exam or instructor-designed competency profile
**Illinois***: Developing assessment instruments to measure applied academics, technical skills, and workplace skills
**Indiana***: Complete certificate/license; local agency chooses instrument
**Iowa***: Local agency identifies or develops instrument (performance tests or other assessment instruments)
**Kansas***: KS occupational file or competency checklist: "all aspects of the industry" tests to be developed
**Kentucky**: 2.0 GPA in vocational-technical courses
**Louisiana***: Local agency chooses instrument
**Maine**: *Specific* - based upon DACUM and Accreditation standards; *General* - Jobs for America's Graduates Competency Test (JAG)
**Maryland****: Written Skill Competency and Performance Tests or Individualized Competency Certificates or Employability Profiles
**Massachusetts**: Phasing in during 1993-1994
**Michigan**: Program completion
**Minnesota**: No plans to measure at this time
**Mississippi**: Passing a comprehensive examination (locally chosen) on the major competencies and skills in the total program; *or* documentation of competency through the use of an individual student competency profile
**Missouri***: Occupational and employability skills for entry-level employment identified by district and approved by Department (statewide listing to be developed)
**Montana**: Local agency chooses instrument
**Nebraska***: *Specific* - local agency chooses occupational competency exam; *General* - local agency chooses instrument (competencies such as Work Readiness or Youth Works)
**Nevada**: Local agency chooses (observation, testing, and hands-on demonstrations)
**New Hampshire**: Local agency chooses instrument (occupational skill profiles and/or competency checklists)
**New Jersey**: Certification and licensure examinations or nationally recognized examinations (NOCTI)
**New Mexico**: No plans to measure at this time
**New York**: *Basic* - occupational sequence of three or more units; *Advanced* - occupational sequence of five or more units
**North Carolina**: Core competencies on the statewide blueprint with a test bank for pre- and post-testing for Level I and Level II courses
**North Dakota**: Local agency chooses instrument
**Ohio**: Vocational competency test offered by the Vocational Instructional Materials Laboratory at Ohio State University or an alternative standardized test
**Oklahoma**: Occupational test developed by OK that includes written and performance components
**Oregon**: Course completion
**Pennsylvania**: Program completion
**Rhode Island**: State-approved criterion-referenced competency exams or norm-referenced standardized competency examinations (twelfth grade)
**South Carolina**: Local agency chooses between "traditional assessments" (pre-tests/post-tests, classroom grades, SC Occupational Competency Tests) or "performance assessments" (observations, product analyses, etc.)
**South Dakota**: Local agency chooses instrument
**Tennessee**: To be implemented in 1993-1994 (certification or pre-test and post-test)
**Texas**: Certification by licensing or certification agency *or* validated test of occupational competency *or* completion of sequence of courses
**Utah***: Locally developed tests and performance assessments of Applied Technology Competencies (implemented in 1984/Utah-developed Critical Workplace Skills)
**Vermont**: *Specific* - state-approved competencies and task list; *General* - Ten employability skills and eleven workplace traits demonstrated on a scale of 1 to 4 to be evaluated by instructor
**Virginia**: Instructor certification based on approved competency lists *or*, if appropriate, occupational licensure exam scores
**Washington***: Local agency chooses instrument (state-level competencies)
**West Virginia**: State-adopted core contest in specific occupational areas
**Wisconsin**: No plans to measure at this time
**Wyoming***: Local agency chooses instrument

*Measures specific occupational and general employability skills by method described.
**Measures general employability skills only.

Source: Rahn, Hoachlander, & Levesque (1992)



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## Table A-2.7
## Summary of Assessment Instruments and Measurement Tools Used to Measure Occupational Skills in Postsecondary Vocational Education

**Alabama**: No plans to measure at this time
**Alaska**: No plans to measure at this time
**Arizona**: Local agency identifies competencies and instrument (may use state-validated competencies)
**Arkansas**: Instructor identifies instrument/performance test
**California**: Program/course completion
**Colorado***: Local agency chooses instrument (competencies - SCANS)
**Connecticut****: Local agency chooses instrument
**Delaware**: Phasing in during 1995 (competencies - SCANS)
**Florida**: No plans to measure at this time
**Georgia***: Local agency chooses instrument
**Hawaii**: Vocational course completion
**Idaho**: Completion of programs, GPA
**Illinois***: Developing assessment instruments to measure applied academics, technical skills, and workplace skills
**Indiana***: Complete certificate/license; local agency chooses instrument
**Iowa**: Local agency identifies or develops instrument (performance tests or other assessment instruments)
**Kansas***: KS occupational file or competency checklist; "all aspects of the industry" tests to be developed
**Kentucky**: 2.0 GPA in vocational-technical courses
**Louisiana***: *Technical institutes, higher education, and tech prep* - developed or selected by locals or student organization written and performance tests
**Maine***: *Specific* - based upon DACUM and Accreditation standards; *General* - Jobs for America's Graduates Competency Test (JAG)
**Maryland**: Awards (degrees and certificates), Licensure, and Certification
**Massachusetts**: Phasing in during 1993-1994
**Michigan**: Program completion
**Minnesota**: To be phased in during 1994 (industry-based accountability, Graduate Grades by Special Populations)
**Mississippi**: Passing a comprehensive examination (locally chosen) on the major competencies and skills in the total program; or documentation of competency through the use of an individual student competency profile
**Missouri***: Occupational and employability skills for entry-level employment identified by district/institution and approved by Department (statewide listing to be developed)
**Montana**: Local agency chooses instrument
**Nebraska***: *Specific* - local agency chooses occupational competency exam; *General* - local agency chooses instrument (competencies such as Work Readiness or Youth Works)
**Nevada**: Certification or licensing exam
**New Hampshire**: Local agency chooses instrument
**New Jersey**: Certification and licensure examinations or nationally recognized examinations
**New Mexico**: Passing certification and licensure exams
**New York***: Institutions submit a Student Skills Acquisition Assessment Plan that includes a description of the process used to evaluate the acquisition of skills (e.g., grade of "C" or better, skills portfolio, licensure examinations, etc.)
**North Carolina**: No plans to measure at this time
**North Dakota**: Locally chosen instruments to measure competencies/tasks
**Ohio**: To be developed. Some possibilities are as follows: licenser/certification exams, comprehensive exam, course completion, employer surveys, client surveys; *Adult education* - vocational competency test offered by the Vocational Instructional Materials Laboratory at Ohio State University or an alternative standardized test
**Oklahoma**: Occupational test developed by OK that includes written and performance components
**Oregon**: Program completion
**Pennsylvania**: GPA of at least 2.5 in occupational courses
**Rhode Island**: Completion of degree/certificate requirements
**South Carolina**: Institutions select/develop own assessment system
**South Dakota**: Local agency chooses instrument
**Tennessee**: No plans to measure at this time
**Texas**: Course or program completion and grades received
**Utah***: Course completion (additionally, implement the Utah-developed program Critical Workplace Skills in 1994 or 1995)
**Vermont**: Student survey
**Virginia**: Locally chosen instruments to measure competencies
**Washington***: Program completion
**West Virginia**: Course completion
**Wisconsin**: No plans to measure at this time
**Wyoming***: Local agency chooses instrument

*Measures specific occupational and general employability skills by method described.
**Measures general employability skills only.

Source: Rahn, Hoachlander, & Levesque (1992)

# CHAPTER 3 APPENDIX

# Appendix 3-A

## Goals 2000: Educate America Act

### Title IV — National Skill Standards Board

*Sec. 401 Purpose.*

It is the purpose of this title to establish a National Board to serve as a catalyst in stimulating the development and adoption of a voluntary national system of skill standards and certification that will serve as a cornerstone of the national strategy to enhance workforce skills, and that can be used, consistent with Federal civil rights laws —

(1) by the Nation, to ensure the development of a high skills, high quality, high performance workforce, including the most skilled front-line workforce in the world, and that will result in increased productivity, economic growth and American economic competitiveness;

(2) by industries, as a vehicle for informing training providers and prospective employees of skills necessary for employment;

(3) by employers, to assist in evaluating the skill levels of prospective employees and to assist in the training of current employees;

(4) by labor organizations, to enhance the employment security of workers by providing portable credentials and skills;

(5) by workers, to obtain certifications of their skills to protect against dislocation, to pursue career advancement, and to enhance their ability to reenter the workforce;

(6) by students and entry level workers, to determine the skill levels and competencies needed to be obtained in order to compete effectively for high wage jobs;

(7) by training providers and educators, to determine appropriate training services to offer;

(8) by Government, to evaluate whether publicly-funded training assists participants to meet skill standards where they exist and thereby protect the integrity of public expenditures;

(9) to facilitate the transition to high performance work organizations;

(10) to increase opportunities for minorities and women, including removing barriers to the entry of women in non-traditional employment; and

(11) to facilitate linkages between other components of the workforce investment strategy, including school-to-work transition, secondary and postsecondary vocational-technical education, and job training programs.

# CHAPTER 4 APPENDIX

# Appendix 4-A

## Some 1980s Reports on Educating the Workforce

In 1984, the College Board assembled 200 business leaders and educators to discuss academic preparation for work. The conference recommended a more advanced and work-relevant form of the three Rs, and also called for attention to speaking and listening skills and an emphasis on the ability to reason.

In 1987, the National Alliance of Business published *The Fourth R: Workforce Readiness*, which emphasized education in the three Rs, speaking and listening, problem solving, working in organizations, and work ethics.[1]

In 1988, the American Society for Training and Development (ASTD) published a report called *Workplace Basics: The Skills Employers Want*.[2] Like its predecessors, the ASTD report emphasized the three Rs, speaking and listening, and reasoning abilities. In addition, the ASTD report emphasized the need for interpersonal skills, teamwork, and leadership.

Other reports on the subject, including the Labor Department's *Workforce 2000*[3] and the Secretary's Commission on Achieving Necessary Skills (SCANS),[4] emphasized the importance of developing a range of work-related skills that spanned both academic and vocational programs. As a rule, these reports place little, if any, emphasis on specific "hard" skills, such as knowing how to operate a drill press or build a brick wall, and considerable emphasis on the development of thinking skills and the interpersonal skills of the workplace.

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[1] National Alliance of Business (1987). *The Fourth R: Workforce Readiness*. Washington, DC: Author.

[2] Carnevale, A.P., et al. (1988). *Workplace Basics: The Skills Employers Want*. Alexandria, VA: American Society for Training and Development.

[3] Johnston, W.B., & Parker, A. (1987). *Workforce 2000: Work and Workers for the 21st Century*. Indianapolis, IN: Hudson Institute.

[4] Secretary's Commission on Achieving Necessary Skills (1991). *What Work Requires of Schools: A SCANS Report for America 2000*. Washington, DC: U.S. Department of Labor.

# Appendix 4-B

## Models of Postsecondary Integration (from Grubb and Kraskouskas, 1992, cited in Stasz et al., 1992)

1. **General education requirements.** Many schools require occupational students to enroll in general education courses. While most schools do not modify these classes to suit vocational students' needs, many at least offer guidance as vocational students choose their courses.

2. **Applied academic courses.** These are academic courses that utilize applications in occupational areas and are primarily designed for occupational students. Examples include technical writing, business math, and agricultural economics.

3. **Cross-curricular programs.** These types of programs offer a way for more academic content to be included in occupational programs, by emphasizing both the academic and vocational content. The most common form is Writing Across the Curriculum, but other versions include Communications Across the Curriculum, Humanities Across the Technologies, and Reading Across the Curriculum.

4. **Incorporating academic modules in occupational courses.** At the classroom level, some occupational instructors incorporate academic modules in their occupational curriculum. Instructors might include academic disciplines such as history or ethics in their courses.

5. **Multi-disciplinary courses combining academic perspectives and occupational concerns.** In most cases these courses are designed by academic and occupational faculty working together. Some of the more common themes are the role of work for individuals and society, the history of technology and its effects on society, ethical issues surrounding work and technological change.

6. **Tandem and cluster courses and learning communities.** Such groupings provide a structure for integration since students take complementary courses — both academic and vocational — concurrently. In this model, teachers may reinforce material taught in the related courses, analyze similar issues from various perspectives, utilize common examples and applications, design projects for more than one course, or build on concepts taught in other courses.

7. **Colleges-within-colleges.** These can best be described as expanded clusters. Colleges-within-colleges are rare since most students are either unable or unwilling to commit to an entirely pre-set program.

8. **Remediation and ESL programs with an occupational focus.** These types of programs were developed to address the needs of vocational students requiring academic remediation and ESL (English as a second language) instruction. They focus on relatively basic skills, but include introductory material in an occupational area. Like applied courses, they provide an occupational context for vocational students.

# Appendix 4-C

## Some Initiatives for National Education Reform

The Carl D. Perkins Vocational and Applied Technology Act of 1990 provides grants to states for secondary, postsecondary, and adult vocational education programs and services. The purpose of the grants is to improve educational programs that lead to academic and occupational skill competencies needed to work in a technologically advanced society.

In 1991, the Labor Secretary's Commission on Achieving Necessary Skills (SCANS)[1] found that work involved five competencies and three foundation skills. The competencies are resources, interpersonal, information, systems, and technology. The foundation skills are basic skills, thinking skills, and personal qualities.

*America's Choice: High Skills or Low Wages* was a 1990 report of the Commission on the Skills of the American Workforce.[2] The Commission emphasized that new high-performance forms of work organization have different requirements than manufacturing-based work. Employers must be prepared to invest heavily in training existing workers to compensate for the slowing of workforce growth in the 1990s.

America 2000 is a national strategy outlined by President Bush and state governors at the 1989 Education Summit in Charlottesville, Virginia.[3] The strategy emphasizes readiness for school, high school completion, safe schools, educational accountability, life-long learning, and world class performance standards that establish what students need to know in five core subjects. The National Education Goals Reports of 1991 and 1992 are annual report cards describing progress toward the America 2000 goals.[4]

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[1] Secretary's Commission on Achieving Necessary Skills (1991). *What Work Requires of Schools: A SCANS Report for America 2000*. Washington, DC: U.S. Department of Labor.

[2] National Center on Education and the Economy (1990). *America's Choice: High Skills or Low Wages*, the report of the Commission on Skills of the American Workforce. Rochester, NY: Author.

[3] U.S. Department of Education (1991). *America 2000: An Education Strategy*. Washington, DC: Author.

[4] National Education Goals Panel (1991). *The National Education Goals Report: Building a Nation of Learners*. Washington, DC: Author; National Education Goals Panel (1992). *The National Education Goals Report 1992*. Washington, DC: Author.



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**Table A-4.1**
**Percent of Perkins-Funded and Unfunded Districts Taking Specific Steps to Integrate, 1991–92**

| Steps Toward Integration | Regular | | Vocational | |
|---|---|---|---|---|
| | Funded | Unfunded | Funded | Unfunded |
| Hold planning meetings | 75 | 55 | 91 | 79 |
| Develop guidance and counseling activities to promote integration | 69 | 59 | 74 | 66 |
| Integrate curricula across academic and vocational courses | 70 | 57 | 87 | 67 |
| Provide in-service training for vocational teachers on integration | 61 | 48 | 74 | 71 |
| Develop sequences of integrated academic and vocational courses | 57 | 45 | 77 | 66 |
| Provide in-service training for academic teachers on integration | 48 | 40 | 65 | 51 |
| Develop occupational clusters, career paths, or occupational majors | 46 | 33 | 70 | 67 |
| Evaluate vocational teachers on instruction in mathematics, reading, and/or writing | 27 | 23 | 34 | 32 |
| Develop academies or occupationally oriented schools within schools | 22 | 7 | 28 | 20 |
| Develop occupationally oriented magnet high schools | 13 | 1 | 20 | 13 |

Source: Omnibus Surveys of Regular and Vocational Districts

**Table A-4.2**
**Percent of Community Colleges and Postsecondary Vocational Institutes Taking Specific Steps to Integrate Academic and Vocational Education, 1990–91 and 1991–92**

| Steps Toward Integration | Community College | | Postsecondary Vocational Institute | |
|---|---|---|---|---|
| | 1991 | 1992 | 1991 | 1992 |
| Support remedial/developmental education | 96 | 98 | 93 | 91 |
| Establish general education competencies for occupational/technical students | 73 | 84 | 78 | 85 |
| Hold planning meetings to establish policies or procedures for integration | 59 | 78 | 61 | 73 |
| Develop applied academics courses (e.g., Technical Math, Business English) | 72 | 73 | 71 | 74 |
| Use cross-curriculum materials (e.g., Writing Across the Curriculum) | 61 | 70 | 34 | 41 |
| Provide in-service training for vocational faculty on integration | 31 | 46 | 37 | 46 |
| Provide "tandem" courses where students take coordinated vocational and academic courses | 40 | 43 | 43 | 45 |
| Provide in-service training for academic faculty on integration | 24 | 37 | 27 | 35 |
| Provide interdisciplinary courses combining occupational issues and academic disciplines | 31 | 35 | 26 | 30 |
| Use applied academics or other integrated courses from commercial vendors | 12 | 21 | 24 | 30 |

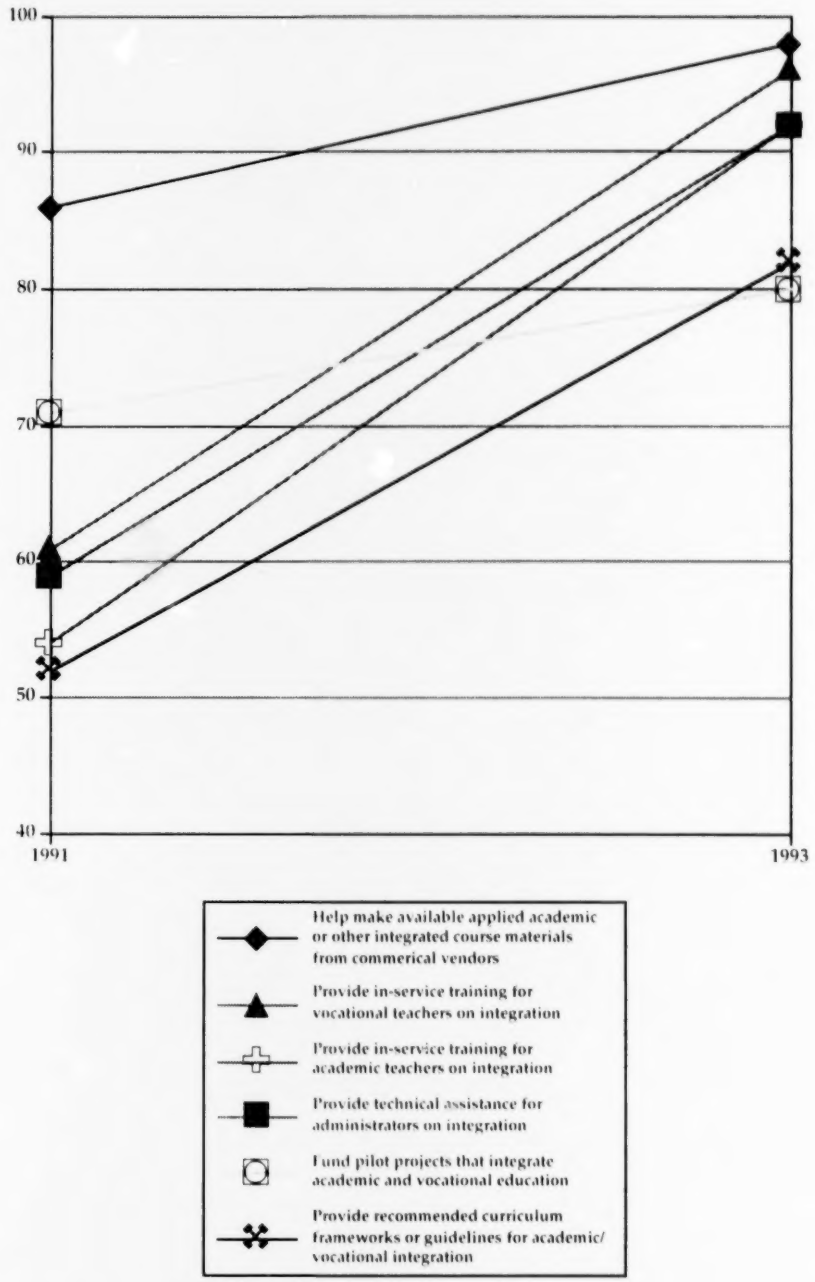
Source: Omnibus Survey of Postsecondary Institutions

**Table A-4.3**
**Percent of Community Colleges and Postsecondary Vocational Institutes Taking Specific Steps to Integrate Academic and Vocational Education, by Funding Status**

| Steps Toward Integration | Community College | | Postsecondary Vocational Institute | |
|---|---|---|---|---|
| | Funded | Unfunded | Funded | Unfunded |
| Support remedial/developmental education | 98 | 98 | 95 | 89 |
| Establish general educational competencies for occupational/technical students | 85 | 78 | 85 | 84 |
| Hold planning meetings to establish policies or procedures for integration | 78 | 78 | 71 | 83 |
| Develop applied academics courses (e.g., Technical Math, Business English) | 77 | 73 | 74 | 75 |
| Use cross-curriculum materials (e.g., Writing Across the Curriculum) | 69 | 55 | 39 | 45 |
| Provide in-service training for vocational faculty on integration | 47 | 41 | 46 | 46 |
| Provide "tandem" courses where students take coordinated vocational and academic courses | 43 | 40 | 46 | 40 |
| Provide in-service training for academic faculty on integration | 38 | 32 | 35 | 35 |
| Provide interdisciplinary courses combining occupational issues and academic disciplines | 38 | 27 | 27 | 35 |
| Use applied academics or other integrated courses from commercial vendors | 23 | 13 | 30 | 29 |

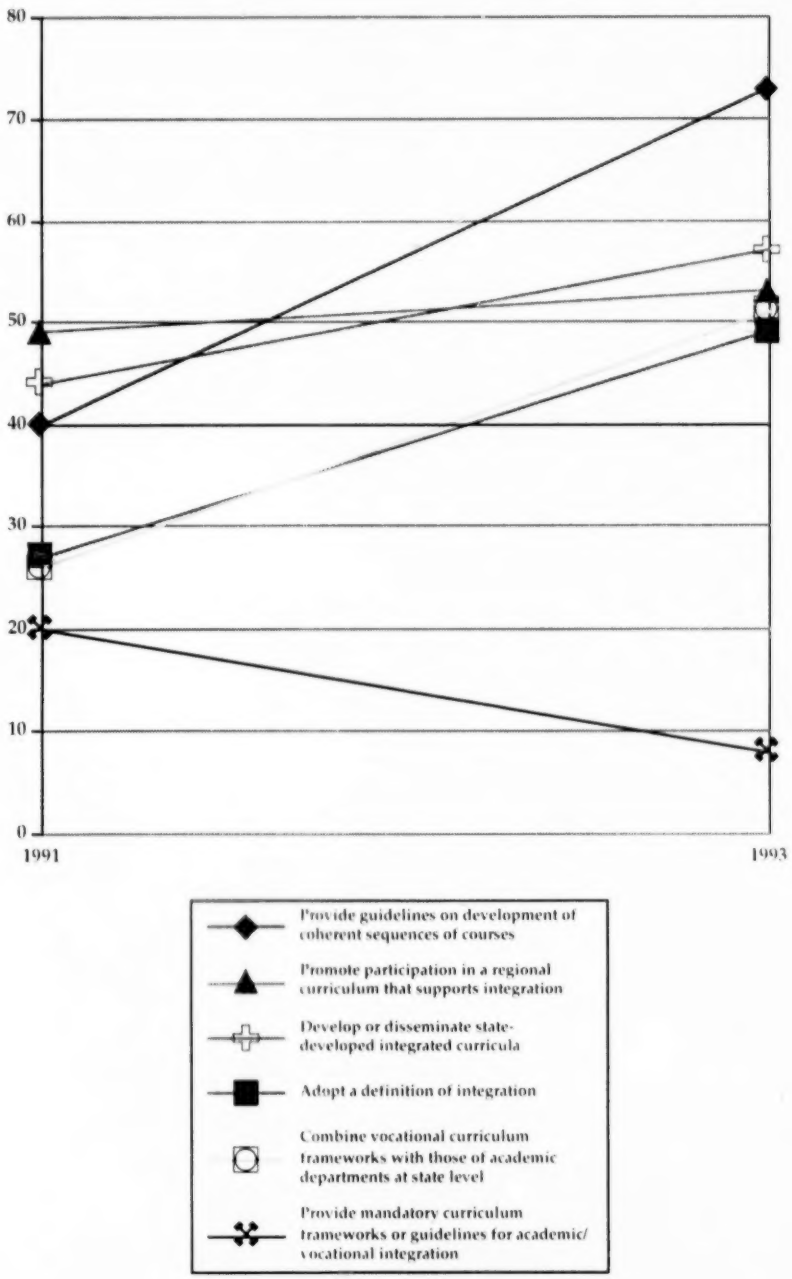
Source: Omnibus Survey of Postsecondary Institutions

**Figure A-4.1**
**Percent of State Secondary Agencies Taking Steps to Integrate Curricula, 1991, 1993: Steps 1–6**


100
90
80
70
60
50
40
1991
1993
Help make available applied academic or other integrated course materials from commerical vendors
Provide in-service training for vocational teachers on integration
Provide in-service training for academic teachers on integration
Provide technical assistance for administrators on integration
Fund pilot projects that integrate academic and vocational education
Provide recommended curriculum frameworks or guidelines for academic/ vocational integration

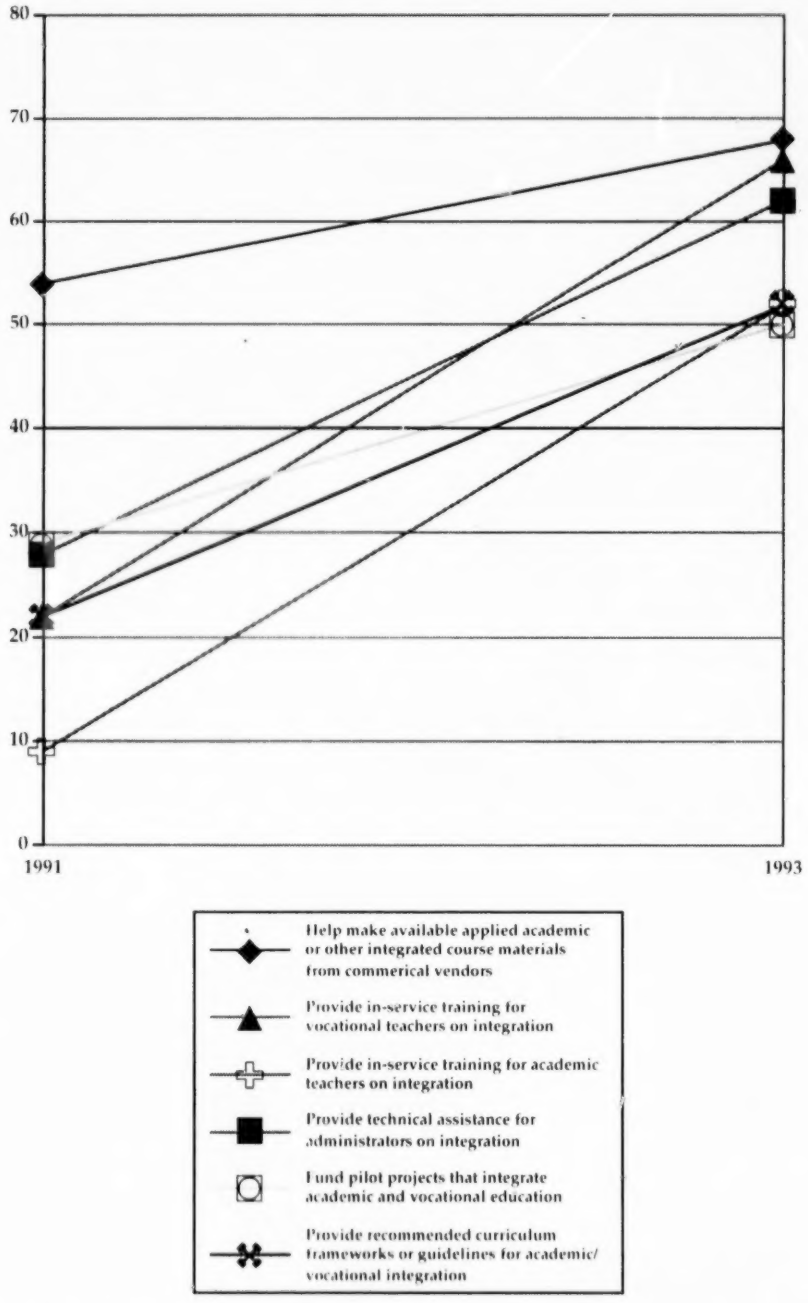
Sources: Omnibus and 1993 Followup Surveys of Secondary State Agencies

**Figure A-4.2**
**Percent of State Secondary Agencies Taking Steps to Integrate Curricula, 1991, 1993: Steps 7–12**



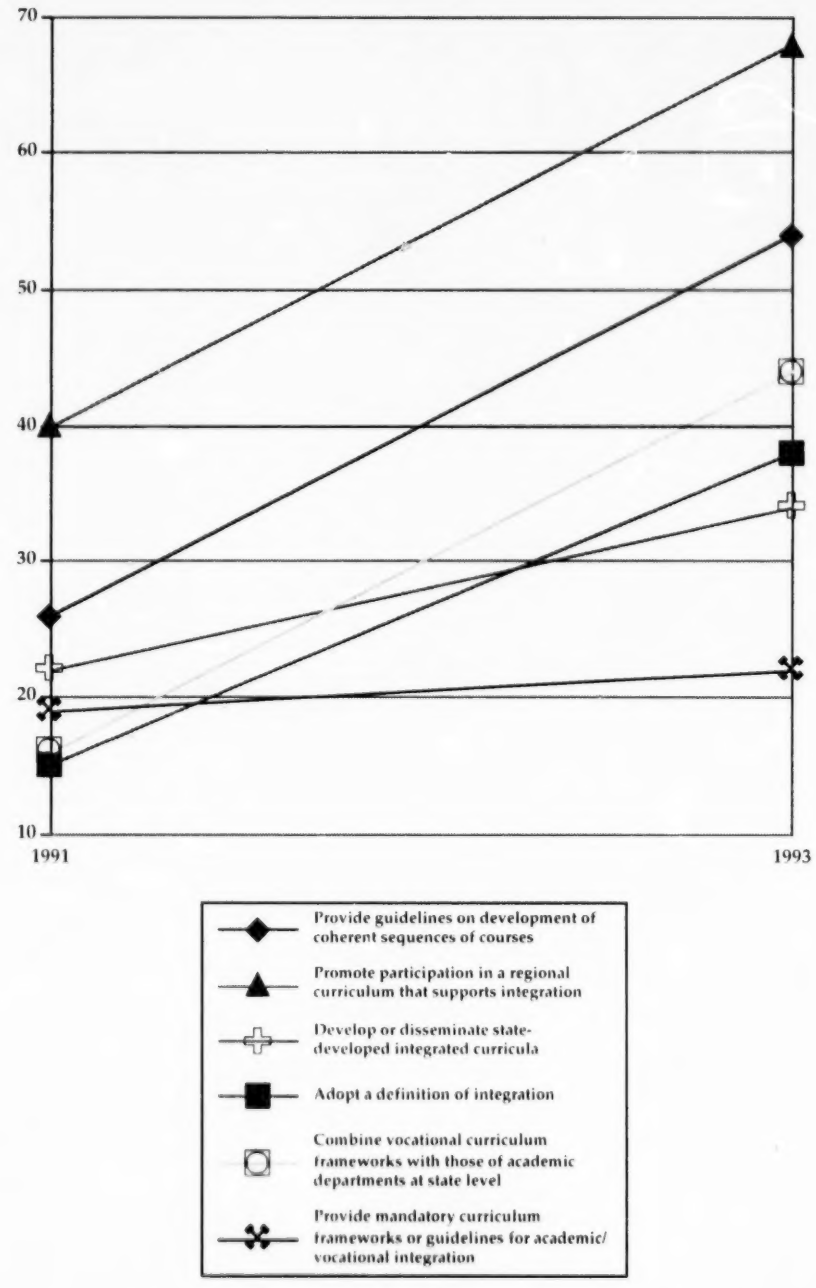

Sources: Omnibus and 1993 Followup Surveys of Secondary State Agencies

**Figure A-4.3**
**Percent of Postsecondary State Agencies Taking Steps to Integrate Curricula, 1991, 1993: Steps 1–6**




Sources: Omnibus and 1993 Followup Surveys of Postsecondary State Agencies

**Figure A-4.4**
**Percent of State Postsecondary Agencies Taking Steps to Integrate Curricula, 1991, 1993: Steps 7–12**




Sources: Omnibus and 1993 Followup Surveys of Postsecondary State Agencies



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# CHAPTER 5 APPENDIX

**Table A-5.1**
**Steps Taken to Implement Tech-Prep Programs in Regular Secondary Districts (Percent of Districts)**

| Steps Toward Tech Prep | Before 1991–1992 | By 1991–1992 | By 1992–1993 |
|---|---|---|---|
| Hold tech-prep meetings with local postsecondary institutions | 50 | 92 | 95* |
| Form consortium with other local education agencies for tech-prep purposes | 37 | 81 | 84* |
| Tech-prep policy adopted by governing board | 29 | 66 | 86* |
| Develop activities or programs to prepare students for tech-prep option | 31 | 70 | 92* |
| Modify curricula for tech-prep | 31 | 73 | 90* |
| Establish formal tech-prep enrollment procedures | 21 | 48 | 78* |
| Develop "all aspects of the industry" curriculum for use in tech-prep program | 13 | 36 | 57* |
| Employ a tech-prep coordinator | 15 | 40 | 63 |
| Develop/provide course sequences[a] | 30 | 70 | 86 |
| Provide teacher or counselor training on tech prep | 32 | 79 | 91* |
| Provide teacher training on tech prep | — | — | 87 |
| Provide counselor training on tech prep | — | — | 77 |
| Have a competency-based curriculum | — | — | 83 |
| Develop student competence in math, science, and communications | — | — | 85 |
| Provide courses that integrate academic and vocational curricula | — | — | 88 |
| Provide technical preparation in at least one of six designated fields[b] | — | — | 88 |
| Have job placement services specifically for tech-prep students | — | — | 35 |
| Have entry requirements other than prerequisite courses | — | — | 24 |

* In 1992 Omnibus Survey, reported as "planned or continuing in 1993."

[a] "Develop course sequences for tech prep" (Omnibus Survey). "Provide structured sequences of secondary and postsecondary courses" (Followup Survey).

[b] Engineering technology; applied science; mechanical, industrial, or practical arts; agriculture; health; or business.

Sources: Omnibus and Followup Surveys of Regular Districts

**Table A-5.2**
**Steps Taken to Implement Tech-Prep Programs in Secondary Vocational Districts (Percent of Districts)**

| Steps Toward Tech Prep | Before 1991–1992 | By 1991–1992 | By 1992–1993 |
|---|---|---|---|
| Hold tech-prep meetings with local postsecondary institutions | 62 | 97 | 99* |
| Form consortium with other local education agencies for tech-prep purposes | 40 | 86 | 90* |
| Tech-prep policy adopted by governing board | 35 | 67 | 86* |
| Develop activities or programs to prepare students for tech-prep option | 32 | 75 | 95* |
| Modify curricula for tech-prep | 39 | 80 | 96* |
| Establish formal tech-prep enrollment procedures | 22 | 55 | 89* |
| Develop "all aspects of the industry" curriculum for use in tech-prep program | 19 | 50 | 71* |
| Employ a tech-prep coordinator | 16 | 44 | 77 |
| Develop/provide course sequences[a] | 36 | 79 | 80 |
| Provide teacher or counselor training on tech prep | 26 | 71 | 93* |
| Provide teacher training on tech prep | — | — | 86 |
| Provide counselor training on tech prep | — | — | 83 |
| Have a competency-based curriculum | — | — | 87 |
| Develop student competence in math, science, and communications | — | — | 85 |
| Provide courses that integrate academic and vocational curricula | — | — | 89 |
| Provide technical preparation in at least one of six designated fields[b] | — | — | 89 |
| Have job placement services specifically for tech-prep students | — | — | 22 |
| Have entry requirements other than prerequisite courses | — | — | 73 |

* In 1992 Omnibus Survey, reported as "planned or continuing in 1993."

[a] "Develop course sequences for tech prep" (Omnibus Survey). "Provide structured sequences of secondary and postsecondary courses" (Followup Survey).

[b] Engineering technology; applied science; mechanical, industrial, or practical arts; agriculture; health; or business.

Sources: Omnibus and Followup Surveys of Vocational Districts

**Table A-5.3**
**Steps Taken to Implement Tech-Prep Programs in Postsecondary Institutions (Percent of Institutions)**

| Steps Toward Tech Prep | Before 1991–1992 | By 1991–1992 | By 1992–1993 |
|---|---|---|---|
| Hold tech-prep meetings with local districts or schools | 64 | 98 | 99* |
| Develop articulation agreement(s) with local school districts or schools | 71 | 93 | 98* |
| Tech-prep policy adopted by governing board | 37 | 73 | 87* |
| Grant postsecondary credit for high school courses | 59 | 75 | 88* |
| Collaboration between secondary and post-secondary instructors to modify course content | 49 | 83 | 97* |
| Establish secondary/postsecondary majors or career paths | 39 | 76 | 96* |
| Modify postsecondary curricula for tech prep | 25 | 58 | 87* |
| Develop "all aspects of the industry" curriculum for use in tech-prep program | 17 | 43 | 67* |
| Provide written publicity about tech prep to high school students | 30 | 67 | 94* |
| Employ a tech-prep coordinator | 23 | 59 | 75* |
| Develop/provide course sequences[a] | 36 | 71 | 91* |
| Joint training of secondary and postsecondary instructors | 25 | 63 | 84* |
| Provide faculty training on tech prep | — | — | 87 |
| Provide counselor training on tech prep | — | — | 83 |
| Have a competency-based curriculum | — | — | 84 |
| Develop student competence in math, science, and communications | — | — | 92 |
| Provide courses that integrate academic and vocational curricula | — | — | 81 |
| Provide technical preparation in at least one of six designated fields[b] | — | — | 94 |
| Have job placement services specifically for tech-prep students | — | — | 18 |
| Have entry requirements other than prerequisite courses | — | — | 44 |

* In 1992 Omnibus Survey, reported as "planned or continuing in 1993."

[a] "Develop course sequences for tech prep" (Omnibus Survey). "Provide structured sequences of secondary and postsecondary courses" (Followup Survey).

[b] Engineering technology; applied science; mechanical, industrial, or practical arts; agriculture; health; or business.

Sources: Omnibus and Followup Surveys of Postsecondary Institutions

**Table A-5.4**
**Percent and Number of Tech-Prep Programs, Spring 1993**
**Using Stringent Perkins Definition**

| | Secondary Districts | | Postsecondary Institutions | |
|---|---|---|---|---|
| | Percent[a] | Number[b] | Percent | Number |
| Total (districts, institutions) | 100 | 11,527 | 100 | 1,200 |
| Report tech-prep agreement | 47 | 5,441 | 74 | 891 |
| Meet Perkins definition | 15 | 1,679 | 3 | 35 |
| Of those meeting Perkins tech-prep definition: | 100 | 1,679 | 100 | 35 |
| Can report percent female in tech prep | 75 | 1,261 | 60 | 21 |
| Can report percent completing secondary or postsecondary phase | 18 | 307 | 40 | 14 |
| Can report percent continuing from secondary to postsecondary | 15 | 246 | — | — |

[a] Estimates from sample.
[b] *Interim Report* (1994), pp. 343–345.

Source: 1993 Followup Survey

**Table A-5.5**
**Characteristics of Tech-Prep Programs in Regular Districts by Program Area, 1991–92**

| | Agriculture | Business/ Office | Marketing | Occupational Home Economics | Health | Trade & Industrial |
|---|---|---|---|---|---|---|
| Median year of actual or planned implementation | 1992 | 1992 | 1992 | 1992 | 1992 | 1992 |
| Median number of secondary schools participating | 1 | 1 | 3 | 2 | 2 | 1 |
| Median number of postsecondary schools participating | 1 | 1 | 1 | 1 | 1 | 1 |
| Percent of regular districts saying tech-prep program: | | | | | | |
| Includes provisions for special populations | 67 | 60 | 62 | 82 | * | 62 |
| Provides teacher in-service | 92 | 78 | 88 | 94 | * | 82 |
| Provides counselor training | 83 | 67 | 79 | 74 | * | 68 |
| Involves business and industry in program development | 58 | 68 | 71 | 71 | * | 64 |
| Has formal enrollment | 33 | 35 | 21 | 47 | * | 41 |
| If program has formal enrollment, median number of grade 11–12 students enrolled | 18 | 27 | 26 | 25 | 18 | 24 |

* Insufficient information to estimate.

Source: Omnibus District Survey, Version B

## Table A-5.6
## Characteristics of Tech-Prep Programs in Vocational Districts by Program Area, 1991–92

| | Agriculture | Business/ Office | Marketing | Occupational Home Economics | Health | Trade & Industrial |
|---|---|---|---|---|---|---|
| Median year of actual or planned implementation | 1992 | 1992 | 1992 | 1992 | 1992 | 1991 |
| Median number of secondary schools participating | 7 | 3 | 4 | 6 | 4 | 3 |
| Median number of postsecondary schools participating | 1 | 1 | 1 | 1 | 1 | 1 |
| Percent of regular districts saying tech-prep program: | | | | | | |
| Includes provisions for special populations | 61 | 58 | 53 | 59 | 61 | 67 |
| Provides teacher in-service | 74 | 72 | 72 | 76 | 75 | 77 |
| Provides counselor training | 61 | 58 | 56 | 56 | 56 | 66 |
| Involves business and industry in program development | 74 | 79 | 78 | 79 | 80 | 84 |
| Has formal enrollment | 43 | 47 | 34 | 41 | 49 | 49 |
| If program has formal enrollment, median number of grade 11–12 students enrolled | * | 16 | * | * | 40 * | 24 |

* Insufficient information to estimate

Source: Omnibus Survey of Vocational Districts

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Special Handling

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